AMECO

CODE COURSE

PREPARATION FOR AMATEUR AND COMMERCIAL CODE EXAMINATIONS

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AMECO GENERAL CLASS QSO & PRACTICE CODE COURSE, CATALOG NO. 105-QT

The General Class QSO and Practice Code Course is designed to give a prospective amateur operator concentrated additional practice for the General Class code examination. The FCC/VEC General Class code examination consists of receiving English words, numbers and punctuation marks at the rate of 13 words per minute. The applicant then answers ten questions, based on the material that he has copied. These questions may be multiple-choice (as illustrated in this course) or they may be "fill in the blank". He must receive a score of 80% in order to pass the code examination.

The Ameco course is divided into four lessons - the first lesson is at 12 words per minute and the last lesson is at 15 words per minute. In order to insure passing a 13 word per minute test, the prospective operator should be able to receive at least 15 words per minute. The reason for this is that the student is generally nervous when taking the examination and needs this extra two-minute "cushion".

This course assumes that the amateur can receive approximately 10 to 12 words per minute. If not, one or more of the other Ameco code courses should be used to bring the speed of the operator up to 12 words per minute. The other Ameco code courses are listed at the end of these instructions. Originally, a 32 page code learning booklet was included with this course. However, it was found that almost all of the users of this course already knew the basics of code sending and receiving. Nevertheless, if you need a review of basic Morse Code practice, please send a large, self addressed, stamped ($0.39) envelope to the AMECO Publishing Corp. A book on learning the Morse Code will be sent to you free of charge.

It is important to practice sending as well as receiving. As the receiving speed improves, the student should improve his sending speed. The sending should be accurate and "clean".

Each lesson consists of (1) random letters, numbers and punctuation marks, (2) parts of English words, and (3) simulated on-the-air amateur conversations.

After you have copied the random code groups and parts of English words, check yourself with the aid of the information given below. After you have completed the random code groups and parts of words, copy the second part of the lesson which consists of the simulated on-the-air QSO's. Then answer the ten test questions given below. The answers and QSO material are at the end of all these lessons. Do this for each of the four lessons.

The random code groups are more difficult to copy than words. Therefore, they appear to be at higher speeds than they actually are.

LESSON ONE. 12 WPM. RANDOM CODE GROUPS.

BJ2 NHWT OVR7E LQ3 I?EX AUL,C SD5 ATH W4SB T0EL7 R2

APM P6MOP KR1O VACH YN5 U.JT GIMN WC 28/F 9DQ SNO9F YQR TH?O3 SE0IG C1HNA IRJT2 JC6U HWW L5.Y 47AX YGML? AUD. EKZ L1OU 3GC Y5 G/P VJKEI VR8O 4EQ .H,F LD9 X, HD SJE U8S SQ7MY RFI AVG 390 TR7 CUSH MORSE W4XJP PSE $\overline{\text{BT}}$ 39/74 GAIN PRE MODEL W2ZZ OSCAR MHZ PEG FREQ AMP NOISE KEY YAESU WPM QRS AUDIO TNX PL258 BAUDOT OHM BIRD ROTORS HAMFEST IC211 KLM CPY ULTRA PROBE HORIZONS TUNER QUAD TOWER PC COUNTER

LESSON ONE. 12 WPM. QSO EXAMINATION.

1) Who called WN8OBS?
a. K9ZSB b. WN9QSC c. WN8QSC d. WN9YSC
2) In what city does the ham who called WN8OBS live?
a. Cork b. Turk c. Lury d. York
3) In what state does the ham called WN8OBS live?
a. Ohio b. Idaho c. Louisiana d. Iowa
4) In what state does N0TX live?
a. Indiana b. Nebraska c. New York d. Nevada
5) How many watts is N0TX running?
a. 350 b. 450 c. 340 d. 250
6) What is the model number of N0TX's rig?
a. BT802DM c. FT902DM
b. FT801DM d. FT901DM
7) Who is N0TX communicating with?
a. KZ5PS b. WZ5LS c. KZ5PH d. KZ4PS
8) What is the SWR at N0TX's station?
a. 1 : 1 b. 2 : 1 c. 1.25 : 1 d. 1.5 : 1
9) What is the RST of the ham who N0TX is communicating with?
a. 488 b. 489 c. 589 d. 599
10) What is the QTH of N0TX?
a. 35 Bond St. c. 45 Bond St.
b. 35 Land St. d. 34 Bond St.

LESSON TWO. 13 WPM. RANDOM CODE GROUPS.

GV I4KU TWRIZ DN/2 GAIS B5M BAFKY XW3Q8 BJOL JQ TE0Y? NT6C CUJ .WOH5 SKCW6 CPEBT 1CUGY RM LH4/7 FKPQ MV2AX UPTY QI. SU,6 RFNG ROL3Z ED0Z RXV 9EK AHS VE?3R YEV IMDQ2 YS XA ,ZAR AKH4 ICJE O?5D RTUY D.O8 NCEZ I.K3 EC0V AMIG M,A TEMPO MLA250 SSB DB W6KBD BOX IMPEDE VOLT MICRO BEACON FILTER RG58 13.8VDC HPE RIES BW VFO HAM CALIBRATE MULTI TRANS AC OM WHT K MOS FET AGC W2DHL MITTER VSWR QTH 3987 SUNNY APRIL ZONE VF AR SHACK EAST SOLID IMUM VOX MAX KHZ TECH

LESSON TWO. 13 WPM QSO EXAMINATION.

1) What is Joe's call?
a. W2IEG b. W2IEK c. W3IEK d. W2EIK
2) Where does Joe live?
a. Commack c. Commart
b. Bommack d. Coomack
3) Who is Joe in contact with?
a. W2JFS b. W2JLS c. W2JFH d. W2WFS

4) What is the name of the ham who Joe is in contact with?
a. Hal b. Falco c. Halley d. Jalco
5) Who did WD0YVK call?
a. W4XZY b. W4XMQ c. W4XZQ d. W4BZL
6) To what phone number does WD0YVK wish to speak?
a. 638-1885 c. 648-1785
b. 639-1875 d. 639-1785
7) What is Joe's RST?
a. 569 b. 479 c. 469 d. 478
8) What receiver is being used at the QTH of the ham who Joe is in contact with?
a. SX146 b. SX246 c. SX147 d. SX136
9) What transmitter is being used in conjunction with this receiver?
a. TB4 b. TY5 c. TX5 d. TX4
10) How many watts is being used at this transmitter?
a. 340 b. 240 c. 250 d. 350

LESSON THREE. 14 WPM. RANDOM CODE GROUPS.

ASC3 .PTE Z?KU QXO N5DJY 1FVI MQ BKCG VULLO WDXQ GFN MR85 ,4O2W XV 1WZY SCJH K.BNY P?H MAU 2EJER JOY 9/4N, PGB PJP 1K0Y /RM QBEJ 2BM YARQ PT5L PXS? K68N G/9Q F0? DX I7FT WFTT RAM LS 3L9G B/GH SYZ OFRZI EABON SRI BTR FONE BOOM, TUNF VIDEO SO-239 ASCII EIMAC EUROPE NILS PATCH. CLIP? MOBILE PROP FERRITE VOICE REC KN NET JJV $\overline{\text{BT}}$ RX/TX RC TRAFFIC LIMIT FINAL WAVE AMSAT WORLD RADIO K RESONANT RANGE, COAX RESCUE. BAND MAY WINTER INSULATE REPORT OPER CALIF DUTY FIER, EMOB WB2DYG OSCI? ELEMENTS.

LESSON THREE. 14 WPM QSO EXAMINATION.

1) Who is calling CQ?
a. K7XZJ b. K6XZJ c. W6XYJ d. K6XYJ
2) Who responded to the CQ?
a. W9ARM b. W0ARX c. W0NRM d. W0APK
3) What did W3XV miss?
a. a handle c. an address
b. a signal report d. a weather report
4) What is W3XV's name?
a. Brad b. Tom c. Bob d. Trav
5) What is W3XV's HT32A driving?
a. a 30L1 b. a 40L1 c. 3OL1 d. 30L2
6) Where does KL7FRG live?
a. Canada b. Alaska c. Montana d. Alabama
7) Who is KL7FRG in contact with?
a. W6KUT b. K5KVT c. K6KVT d. K5KUT
8) What is the weather at KL7FRG?
a. hot b. cold c. very cold d. very hot
9) What kind of antenna is W3XV using?
a. dipole b. 3 el beam c. HT32 d. SX 101
10) What make of equipment is KL7FRG using?
a. linear c. Drake

b. Collins d. Hallicrafters

LESSON FOUR. 15 WPM. RANDOM CODE GROUPS.

LMZ KXC. DKAVB J/ZNA RI WPTMO RLY EXY ISUH WCMY 4,7Q DKX F7R XOD JLVS6 GXP9 4V/O FGZ6 NNO R3 QY8 ET? 4BAUR EMU SIP35 7BF 3XCQP CKDO ZDA SEMD H4C 2GIZ, 54NH. V6Q RCQ WB85 HD? JGY Q.0C R.LW ON 6AAH ZLG 9RMTW NFB BFO WAVE A-1 QRM MENT ZENER DWN TRIODS, MABE K3XMJ BUFFER ELECT CLICK RPTR FIST DYNAMIC ANCE DIR DIAL SPECT TERMINALS FEAT DECIMAL VLME 24 AUDIBLE CERAMIC THIRD PARTY NOVICE S METF MULTI MODULATE 359 OCT LONG BEACH WORLD WB2KNY RENEW GUD UG260/U NAR WORK CAL PRO MOSLEY HOT WX PWR 115, PTLY BEAM

LESSON FOUR. 15 WPM QSO EXAMINATION.

1) Who is WF5LJP calling?
a. K6QPR b. K7QPR c. K6QXR d. K7ZPR

2) Who is WA3NUT calling?
a. W8BPR b. W9BCR c. W9BXR d. W7BYR

3) Jack is supposed to tell Henry to meet at City Center on:
a. June 22, 6 A.M. c. June 13, 5 A.M.
b. June 23, 5 A.M. d. June 28, 6 A.M.

4) What is the QTH of WA3NUT?
a. Hyner, Pa. c. Hynek, Pa.
b. Hyner, Ca. d. Hynik, Mn.

5) How many watts is WA3NUT's rig running?
a. 150 b. 140 c. 260 d. 160

6) What receiver is WA3NUT using?
a. RNE 69 b. RME 69 c. RME 59 d. RME 79

7) Who is W6ZIL being called by?
a. KAZSC b. KA3CS c. KA3CH d. KA2CH

8) How many feet above the roof is the antenna of the operator who is calling W6ZIL?
a. 24 b. 34 c. 25 d. 35

9) What is the ratio of WA3NUT's balun?
a. 3 to 1 b. 2 to 1 c. 4 to 1 d. 3 to 2

10) What type of antenna does WA3NUT have?
a. quad with 300 ohm to coax.
b. dipole with 200 ohm to coax.
c. folded dipole with 300 ohm to coax.
d. inverted V with 300 ohm to coax.

ANSWERS TO LESSON ONE QSO EXAMINATION.

1. b 2. d 3. a 4. b 5. a
6. d 7. a 8. c 9. c 10. a

LESSON ONE. 12 WPM QSO's.

WN8OBS DE WN9QSC GA OM TNX FER QRS. QTH IS YORK OH. I NEED MR CODE PRACTICE HI. AM PRACTICING WID AMECO CODE OSC $\overline{\text{BT}}$ SURE WRKS VY FB. HW CPY NW? WN8OBS DE WN9QSC K KZ5PS KZ5PS DE N0TX $\overline{\text{BT}}$ SA OM UR SIG SURE FB HR IN LASERVILLE NEB UR RST 589 $\overline{\text{BT}}$ RUNNING A YAESU FT901DM WID 350 WATTS INTO 4 EL 20 BEAM AT 50 FT SWR IS 1.25 : 1 ACCORDING TO MI AMECO SWR MTR. QTH IS 35

BOND ST. IF U GET ON SSB MABE WE CUD WRK A SKED ON 20 MTRS FONE LATER OK? KZ5PS DE N0TX $\overline{\text{AR}}$ $\overline{\text{KN}}$

ANSWERS TO LESSON TWO QSO EXAMINATION.

1. b 2. a 3. a 4. b 5. c
6. d 7. c 8. a 9. d 10. c

LESSON TWO. 13 WPM QSO's.

W2JFS W2JFS DE W2IEK R GE OM TNX FER CALL, UR SIGS RST 589 HR IN COMMACK LI $\overline{\text{BT}}$ NAME IS JOE. HOW COPY OM? WHATS UR QTH? GA OM $\overline{\text{BT}}$ W2JFS DE W2IEK $\overline{\text{KN}}$ W2IEK DE W2JFS $\overline{\text{BT}}$ R R GE JOE ES TNX FER FB RPRT $\overline{\text{BT}}$ UR RST 469 WID SUM QRM HR. HANDLE IS FALCO ES QTH IS 39 EVANS, ZION N.J. RUNNING 250 WATTS TO TX4 ES RCVR IS HALLI SX146 $\overline{\text{BT}}$ WILL SAY 73 FOR NW $\overline{\text{BT}}$ W2IEK DE W2JFS $\overline{\text{AR}}$ $\overline{\text{SK}}$ W4XZQ W4XZQ DE WD0YVK R R TNX FER CUMBACK. CUD U FONE PATCH MIAMI FER ME? NUMBER IS 639-1785. ASK FER BRAD ES TELL HIM I WILL BE DOWN IN MAY $\overline{\text{BT}}$ GA W4XZQ DE WD0YVK $\overline{\text{AR}}$ K

ANSWERS TO LESSON THREE QSO EXAMINATION.

1. b 2. b 3. c. 4. d 5. c
6. b 7. a 8. c 9. a 10. b

LESSON THREE. 14 WPM QSO's.

CQ CQ CQ DE K6XZJ K6XZJ K6XZJ CQ CQ CQ DE K6XZJ K6XZJ HW? K K6XZJ K6XZJ K6XZJ DE W0ARX W0ARX K WB3WUY WB3WUY DE W3XV R TNX FER INFO, UR SIG ALSO VY STRNG HR IN PHILA $\overline{\text{BT}}$ MISSED NAME OF UR QTH BOB $\overline{\text{BT}}$ NAME HR IS TRAV $\overline{\text{BT}}$ ANT COAX FED DIPOLE, RCVR SX101 ES RIG IS HT32A DRIVING 30L1 TO LIMIT. SO AGN RPT UR QTH WB3WUY DE W3XV K W6KUT DE KL7FRG FB TOM TNX FOR CUMBK. QTH IS ICYHOLE ALASKA WX VY CLD, ABT 18 BLW 0 2DAY. SNW ABT 13 FT DEEP OUTSIDE. RIG IS COLLINS S LINE WID 30S1 LINEAR RUNNING A KOOL KILOWATT UR QRP RIG SURE DOING FB JOB. WL BK TO U FR MORE HOT INFO. W6KUT DE KL7FRG K

ANSWERS TO LESSON FOUR QSO EXAMINATION.

1. b 2. c 3. b 4. a 5. d
6. b 7. c 8. a 9. c 10. c

LESSON FOUR. 15 WPM QSO's.

K7QPR K7QPR DE WF5LJP WF5LJP $\overline{\text{BT}}$ R $\overline{\text{BT}}$ VY FB JACK $\overline{\text{BT}}$ MSG FOLLOWS: TELL HENRY HIS FISHING TRIP IS ALL ARRANGED. WILL MEET AT CENTER CITY JUNE 23, 5 AM. SIGNED MARTY $\overline{\text{BT}}$ TNX ES 73 K7QPR DE WF5LJP $\overline{\text{AR}}$ $\overline{\text{SK}}$ W6ZIL W6ZIL DE KA3CH KA3CH R UR MI BST DX SINCE I STARTED QRP QTH IS PYRRA PA. RUNNING 3 WATTS TO MINMITE RIG, ES QUAD ANT $\overline{\text{BT}}$ 24 FT ABOVE ROOF DO YOU STILL CPI? W6ZIL DE KA3CH K W9BXR W9BXR DE WA3NUT R ES TNX FR CALL $\overline{\text{BT}}$ QTH IS HYNER PA $\overline{\text{BT}}$ NAME IS GLEN RIG IS OLD JOHNSON VIKING 2 ABT 160 WATTS $\overline{\text{BT}}$ ANT IS FOLDED DIPOLE WID 300 OHM TO COAX, 4 TO 1 BALUN FED. RCVR IS OLD RME 69 BUT WKS FB. HW DOES SIG SOUND? W9BXR DE WA3NUT K

CODE PRACTICE OSCILLATOR and MONITOR

Model OCM-2

- Large 3″ speaker with volume and tone controls.
- Latest IC circuitry for high quality sound.
- Professional equipment at a very low price.
- Converts to a CW monitor. • Kit form or wired.

Model OCM-2 is a professional, high quality code practice oscillator with an attractive two-color panel. Its 3″ speaker and advanced IC circuitry permit a high quality sound which can be varied in volume and pitch. Speaker or headphones can be used. Once the code has been learned, the OCM-2 can easily be converted into a CW monitor for use with the transmitter. Model OCM-2 is economically priced and is available in kit form or wired. Easy-to-follow instructions make kit-building an interesting, educational project.

Model OCM-2K - in kit form	$16.95
Model OCM-2W - factory wired	$21.95

AMECO EQUIPMENT DIVISION
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NOTES ON CONVERTING CODE PRACTICE OSCILLATOR TO A MONITOR

If the above instructions for converting the Code Practice Oscillator to a monitor are followed, satisfactory results will be achieved for practically all transmitters currently found on the market. However, there are a few transmitters with which the monitor will not perform in a satisfactory manner. In these few cases, it will be necessary to add the circuit shown below in Fig. 4.

When this circuit is added to the monitor, it is no longer necessary to couple a loop into the transmitter. This also reduces the possibility of television interference. The tuned circuit and the monitor antenna take the place of the loop and can be placed at a distance from the transmitter.

If the transmitting antenna is very far from the monitor and coaxial cable is used, use a coaxial "T" fitting in the transmission line. Connect the pickup antenna of the monitor to the center terminal of the middle portion of the "T". Use a 1 to 5 mmfd. condenser between the "T" fitting and the wire to the monitor antenna connection. If the transmitting antenna is very far from the monitor and a twin lead transmission line is used, lay part of the monitor antenna along the transmission line for pickup purposes..

In converting the oscillator to a monitor using the method shown below, follow the first three steps above. Eliminate steps 4 and 5. After the circuit is hooked up to the monitor, short the terminals marked KEY with a small piece of wire. Connect the speaker or phones to the two "SPKR. or PHONES" terminals. Select the coil tap and tune the variable condenser for maximum volume from the monitor when the transmitter is on the air. A weak or chirpy sound indicates insufficient signal. A little closer coupling between the monitor and the transmitter would be needed. The performance as a monitor is as clean as when the CPS is used as a practice oscillator.

The parts for this additional circuit may be purchased in any electronic parts store or from Ameco Equipment Corp. Prices are shown in the circuit in Fig. 4.

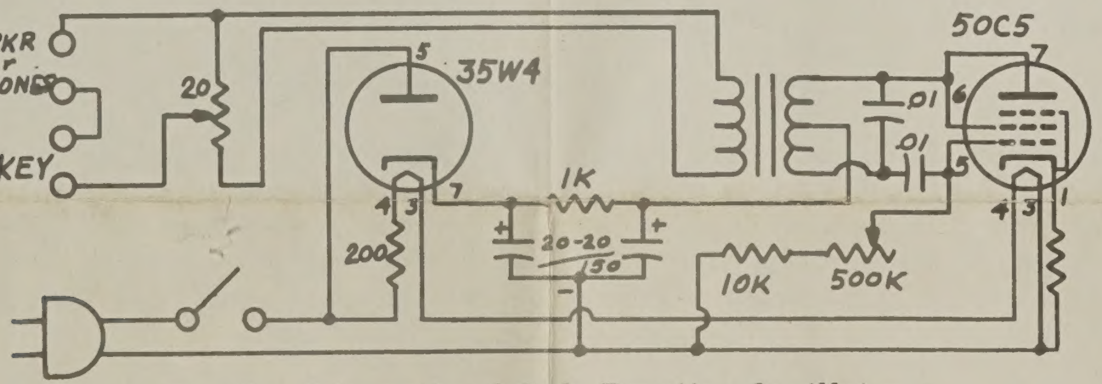


Fig. 2. Schematic of Code Practice Oscillator.

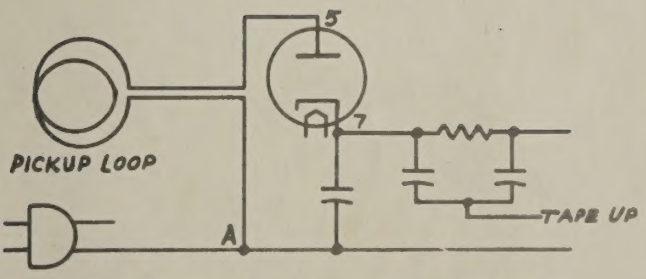
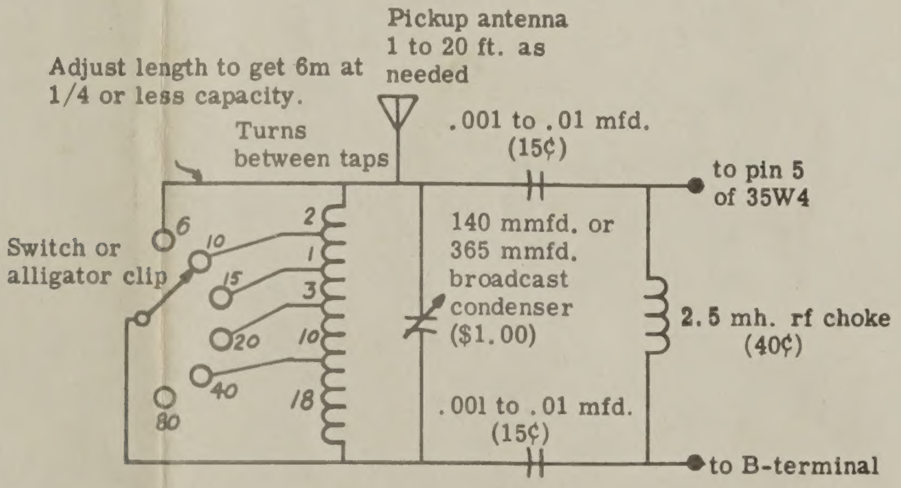


Fig. 3. Changes for operation as Monitor.



34 turns on 1-1/4" form. #22 enamelled wire. Spread out 1 and 2 turn sections. Space between sections - about 1/16". (cost of form - 50¢)

Fig. 4. Tuned pickup unit for Monitor.

LB CPS-OP. INST.

AMECO

AMECO EQUIPMENT CORP.

Division of Aerotron, Inc

AMECO DELUXE CODE PRACTICE OSCILLATOR AND MONITOR
OPERATING INSTRUCTIONS FOR MODELS CPS-KL, CPS-WL, CPS-KT, CPS-WT

Insert the line cord plug into a 110 V. AC or DC receptacle. IF DC is used, it may be necessary to reverse the plug. Hook the key up to the two terminals marked "KEY". If you desire to use a speaker, hook the two wires coming from the speaker to the two terminals marked "SPKR. or PHONES". Should you want to use headphones instead of the speaker, disconnect the speaker leads from the "SPKR. or PHONES" terminals and connect a pair of headphones to these two terminals. Then turn the switch on and adjust the pitch and volume controls for the most desirable tone.

If more than one key is to be used, they should all be hooked in parallel. If two or more sets of headphones are to be used, they too should be hooked in parallel.

CONVERTING CODE PRACTICE OSCILLATOR INTO CW MONITOR

In order to convert the Ameco Code Practice Oscillator into a CW monitor, the following steps should be taken:

1. Disconnect and remove the lead that connects the plate of the 35W4 (pin 5) to the switch.
2. Disconnect the negative (black) lead of the filter condenser from the ground point of the oscillator and tape it up. (Note that the ground point of the oscillator is NOT the chassis. It is the terminal A that the negative lead of the filter condenser was originally connected to).
3. Connect a 0.1 mfd. 400 volt condenser from pin 7 of the 35W4 socket to terminal A.
4. Obtain a 3 foot length of line cord wire and form a two-turn loop (2 inches in diameter) at one end. See diagram. Pass the other end of the line cord through the hole marked "MON." at the rear of the chassis and tie a knot in the line cord on the inside of the chassis.
5. Connect one of the line cord leads to pin 5 of the 35W4. Connect the other line cord lead to terminal A of the oscillator.

The unit is now ready to operate as a CW monitor.

OPERATION OF THE CW MONITOR

In order to monitor a CW signal, place a shorting wire across the two "KEY" terminals and connect the speaker or phones to the two "SPKR. or PHONES" terminals. Place the link near the cold end of the final tank coil of the transmitter. The exact distance between the link (or loop) and the final tank coil depends upon the output power of the transmitter. Move the link close enough to the coil so that sufficient RF energy is picked up to operate the audio oscillator. Then adjust the pitch and volume controls for best results.

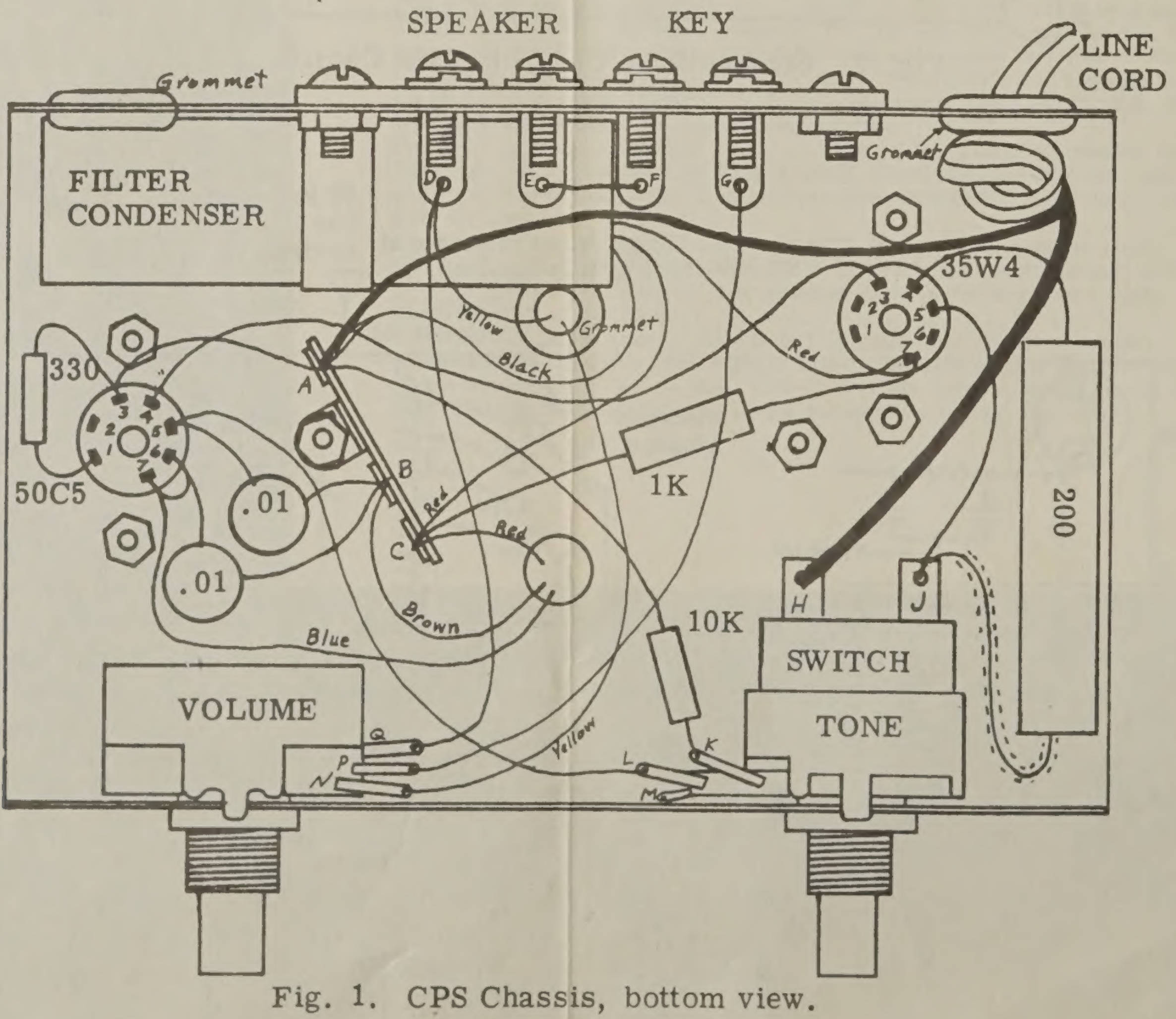


Fig. 1. CPS Chassis, bottom view.

LB

OPERATING INSTRUCTIONS FOR AMECO TRANSMITTER, MODEL TX-62

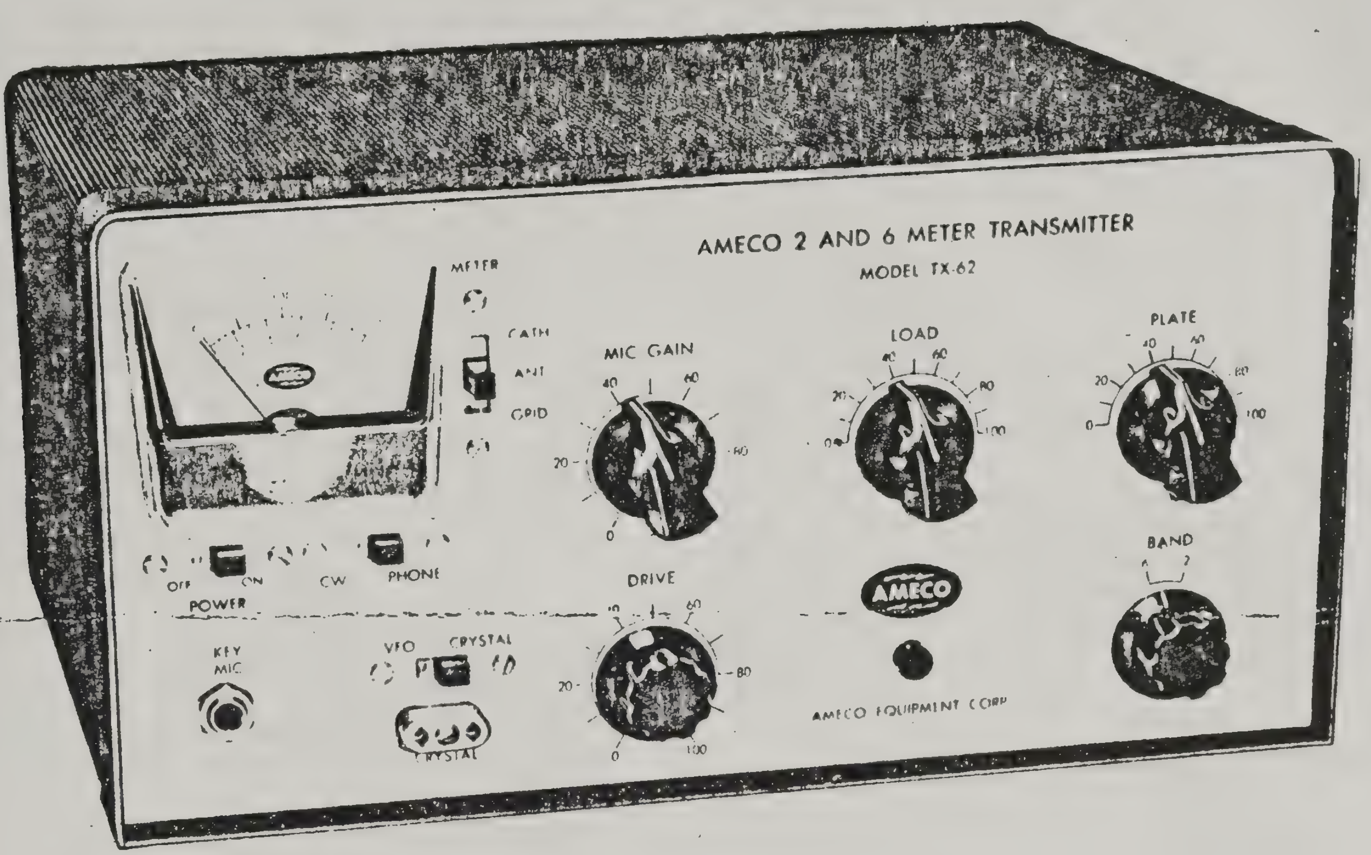
IT IS IMPORTANT THAT THIS ENTIRE MANUAL BE READ CAREFULLY BEFORE THE TRANSMITTER IS PLUGGED INTO AN OUTLET AND BEFORE ANY OPERATING IS DONE WITH THE TRANSMITTER.

Please return to
K3JTE at AMSAT

SAFETY NOTICE

Voltages of over 600 volts DC are present in the TX-62 when the unit is in operation. THESE VOLTAGES CAN BE DANGEROUS. Occasionally a few tests may have to be made inside the set with the high voltage on. NOTE that this voltage is present, whether the key is up or down. Observe all safety precautions. When it is necessary to make measurements with the power on, use only one hand. Keep the other hand in your pocket. Do not lean on the table or touch any other object.

DO NOT ATTEMPT TO MAKE ANY REPAIRS OR CHANGE TUBES WITH THE POWER ON. Disconnect the plug from the AC line before doing any work inside the transmitter.



GENERAL INFORMATION

The Ameco Model TX-62 Transmitter is a compact, convenient, easy-to-operate transmitter for the 6 and 2 meter bands. The TX-62 has 75 watts input on CW and 75 watts peak input on phone. It has a built-in AC power supply and modulator. All exciter circuits are broadbanded. Only the final plate and loading capacitors have to be tuned. A potentiometer-type drive control is used to set the drive level to the final grid. The final is operated straight through on both bands.

The TX-62 uses the low distortion Ameco DUO-GRID modulation. It is NOT controlled carrier or clamp tube modulation, but a far superior system with quality that cannot be distinguished from push-pull plate modulation, even with an oscilloscope. The percentage of modulation is controlled by an audio gain control on the front panel.

SPECIFICATIONS

FREQUENCY COVERAGE: 50-52 Mc. and 144-148 Mc.

POWER INPUT TO FINAL: CW - 75 watts,
Phone - 75 watts peak

TUBES AND FUNCTIONS: 6GK6 crystal controlled oscillator and tripler, 6GK6 doubler, 7868 driver, 7984 final, 12AX7 audio voltage amplifier and 6GK6 modulator. The modulator is used as a clamp tube on CW.

FREQUENCY CONTROL: Crystal controlled, using inexpensive 8 Mc. crystals or an external VFO can be used.

METER reads final cathode current, final grid current and RF output.

CONTROLS: POWER switch; PHONE-CW switch; METER selector switch; VFO-CRYSTAL switch; MIC GAIN control and spot switch; DRIVE control; BAND switch; Final PLATE tuning; LOAD.
The jack for the microphone or key and the crystal socket are on the front panel. Additional connections can be made to an octal socket on the rear of the chassis for key, relay, etc.

SIZE: 11-1/2 x 9-1/2 x 6 inches. WEIGHT: 18-1/2 lbs.

POWER: AC-117 volts, 60 cycles, 220 watts maximum. For 12 volts DC operation, a Heath MP-10 Power Supply

can be used.

ANTENNA: The TX-62 is designed to be used with 50 or 72 ohm coaxial line fed antennas. For balanced lines of 200, 300, 450 or 600 ohms, either a balun made from coaxial cable or an antenna tuner can be used. These will provide the conversion from balanced to coaxial line. See the ARRL Handbooks for details. Baluns are described in the section on Antennas (1964 page 385) and dimensions are in a table in the section on VHF Antennas (1964 page 456). An Antenna Tuner is described in the section on VHF Transmitters (1964 page 452). This data is in all the Handbooks from 1957 on.

The antenna jack is an SO-239 (83-1R) connector which requires a PL-259 (83-1SP) plug on the antenna cable.

For best results, a beam antenna should be used. The more elements the beam has, the better, especially on 2 meters. The "halo", the "big wheel", the "whip" and other non-directional types can be used for net, local contacts and mobile operation.

CRYSTALS: The crystals used are the popular 8 Mc. series -- in FT-243 holders. The frequency of the crystal is multiplied by six to get the transmitting frequency on 6 meters. It is multiplied by 18 to get the transmitting frequency on 2 meters. In other words, 8.3333 Mc. to 8.6667 Mc. crystals are to be used for 6 meters and 8.0000 Mc. to 8.2222 Mc. crystals are to be used for 2 meters. Because phone operation on 6 meters is above 50.10000 Mc., only the crystals above 8.350 Mc. can be used for 6 meter phone operation. If operation in the 145 Mc. to 147 Mc. band is desired, the crystal frequency must be between 8.0555 Mc. and 8.1666 Mc.

VFO: The output of the external VFO must be plugged into the crystal socket and the crystal-VFO switch is then thrown to the VFO position. The ground contact on the VFO-crystal socket is the one next to the MIC jack. The operation of the transmitter is the same for VFO or crystal.

The VFO must be capable of delivering between 7 and 14 volts at 8 Mc. to 8.66 Mc. However, the VFO frequency is not limited to 8 Mc. to 8.66 Mc. Equally satisfactory is a VFO that delivers 2.5 to 5 volts at 12.0 Mc. to 13 Mc., or 1.0 to 2.0 volts at 24 Mc. to 26 Mc. The 24 Mc. to 26 Mc. VFO is the best one to use. The AMECO VFO-621 operates in this range.

MICROPHONE: Any high impedance microphone (crystal, ceramic or dynamic) can be used. The microphone is connected to the transmitter by a three-contact 1/4" diameter phone plug. Switchcraft phone plugs, Models 60, 90, 260, 269, 290 or 297 can be used. Some of these models are shielded and some are not. Shielded types are best, but no difficulty has been noted with the plastic shell plugs.

The tip of the plug is the key line, the ring is the hot side of the microphone and the sleeve is the ground. The microphone cable is attached to the plug in the following manner (See Figure 2): Connect the cable shield from the microphone cable to the sleeve of the plug. Connect the hot microphone lead of the cable to the ring of the plug. Connect the lead coming from the push-to-talk button to the tip of the plug.

No provision is made for the use of a carbon microphone.

KEY: Any key can be used for CW; --- straight, side swiper, bug or electronic.

CIRCUIT DESCRIPTION

The TX-62 uses a 6GK6 pentode tube as a crystal oscillator. It uses standard, inexpensive, 8 to 9 Mc. fundamental type crystals. By throwing a switch on the panel from crystal to VFO, the variable frequency oscillator can be connected to the crystal socket instead of the crystal. When this is done, the 6GK6 oscillator works as an amplifier or frequency multiplier.

The plate of the oscillator is connected to a dual tuned RF transformer (L2 and L3). This feeds the resultant 24 Mc. to 26 Mc. signal to the second 6GK6 tube. This second tube operates as a frequency doubler. Its plate is connected to a dual tuned RF transformer (L4 and L5) which feeds the 48 Mc. to 52 Mc. signal to the third tube, a 7868 pentode. On 2 meters, the 7868 tube is used as a tripler to produce the 144 Mc. to 148 Mc. signal for the final grid, through the broadband transformer, L8 and L9. On 6 meters, the 7868 works straight through, driving the final grid through L6, the 6 meter plate coil which is connected to the link on L11, the final grid coil. The combination of L6 and L11 forms a broadband transformer covering the 6 meter band. No front panel adjustments are used in any of the circuits described above. The circuits are broadbanded and do not have to be tuned.

The final amplifier is a 7984 tube. This is a new type, developed for use in the commercial mobile service for frequencies up to 175 Mc. The plate circuit is a pi-net on 6 meters. It is a series tuned, link coupled arrangement on 2 meters. Separate sections of the same variable capacitor are used for loading on the two bands. One capacitor is used to tune the plate on both bands. To simplify tuning, the meter is connected to a diode RF detector at the bandswitch. It is always better to tune a transmitter for RF output rather than for a plate current dip. They rarely coincide. After tuning, the plate current can always be checked.

The modulator, to the careless eye, appears to be either clamp tube or controlled carrier. It is neither. The TX-62 modulator does not sound like either type. It is clean to listen to, clean to look at on an oscilloscope and gets through when the going is rough. The first tube, a 12AX7, is used as a two-stage voltage amplifier. The second tube, a 6GK6, is the modulator. It is connected to the 7984 final screen as a Heising modulator. A proportion of the audio signal is also fed into the control grid of the 7984. With screen modulation alone, distortion increases sharply above approximately 65% modulation. When the grid is also modulated, as in the Ameco system, this distortion is reduced to a very low value permitting clean, 100% modulation with a very simple circuit. When the transmitter is operated on CW the modulator tube is reconnected as a clamp tube to protect the final in case of loss of excitation. On phone, the reduced screen voltage provides some protection for the final.

INSTALLATION

READ THIS ENTIRE SECTION OVER CAREFULLY BEFORE DOING ANYTHING. THEN START WITH STEP ONE.

DO NOT PLUG THE TRANSMITTER INTO THE AC LINE OUTLET UNTIL THE INSTRUCTIONS BELOW TELL YOU TO DO SO.

1. Connect the wire from the ground terminal at the rear of the chassis to a good ground such as a cold water pipe. All other equipment such as the receiver, converters, power supplies, VFO, etc. should have good connections made to this same ground. Use a #14 or heavier wire. Do not depend on coaxial cable to provide a common ground. The RF bypass capacitors from the AC line to the chassis can give an unpleasant shock if the above grounding instructions are not followed. This is true for all makes of equipment. Do NOT use an AC/DC receiver in this setup.

2. Connect the antenna to the changeover relay or switch.

3. Connect the Standing Wave Bridge, if one is available. Instructions for this come with the Standing Wave Bridge.

4. Hook up the Low Pass Filter, if you are operating on 6 meters. A Drake TV-1000LP is recommended for this use. If you switch to 2 meters, remove the low pass filter from this circuit. The Gavin BP-144 filter is sometimes useful on 2 meters.

5. Connect the receive side of the relay to the converter or receiver.

6. Connect the transmit side of the relay to the coaxial jack on the back of the transmitter.

7. Connect the relay coil (See section on Connecting the Dow-Key Relay).

8. Plug in the microphone.

9. Plug in the crystal. If a VFO is to be used, use a crystal for at least the first tests.

OPERATION FOR PHONE AND CW

1. Preset the TX-62 controls as follows: POWER switch to OFF, CW-PHONE switch to CW, VFO - CRYSTAL switch to CRYSTAL, METER switch to GRID, MIC GAIN at zero, DRIVE at 100, LOAD at zero, PLATE at about 50, BAND switch set on the band to be tuned up, Key or microphone switch should be open

2. Plug the line cord of the transmitter into the AC wall outlet.

3. Throw the power switch on. Wait for at least one full minute for the tubes to warm up.

4. Key the transmitter with the key or the button on the microphone momentarily and watch the meter. It should read between 2 and 9 ma.

5. If the meter reads above 5 ma., turn the drive control down to obtain a reading between 2 ma. and 5 ma.

6. Throw the meter switch to ANT.

7. Key the transmitter and tune the PLATE capacitor for maximum reading on the meter.

8. Key the transmitter and adjust the LOAD capacitor for maximum reading.

9. Repeat steps 7 and 8 several times until no further increase is obtained. Do NOT hold the key down for a long time. Hold it for just a few seconds at a time while each adjustment is made. During tuneup, it is very easy to overheat the final amplifier tube and shorten its life.

NOTE: Step 10 is for CW operation only. Steps 11 through 13 are for Phone Operation only.

10. (CW OPERATION ONLY) Throw the meter switch to GRID. Adjust the drive control for 3 ma. on the meter. Satisfactory results can be had with as little as 2 ma.

The transmitter is now tuned up for CW operation.

The following steps are for Phone operation only.

11. Throw the CW-PHONE switch to PHONE. Throw the METER switch to GRID. Adjust the DRIVE control for 3 ma. on the meter. Satisfactory results can be had with as little as 2 ma.

12. Throw the METER switch to ANT. This will permit observation of the RF output to the antenna, including the variations with modulation.

13. Adjust the MIC GAIN control until the meter swings up the scale on a few words -- on peaks -- about one-quarter way between the meter reading for CW and the meter reading for Phone when there is no modulation. If the meter does not swing at all, the modulation is too low. Either talk closer to the microphone or talk louder or turn the MIC GAIN control up higher. When the swing is excessive, the modulation is also excessive, causing distortion and often poor readability. In this case, turn the MIC GAIN control down.

The transmitter is now tuned for Phone operation.

Note that in the tuneup procedures above, the plate current is not mentioned. Accurate tuning cannot be had by tuning the TX-62 for plate current dip. A typical range of meter readings on CATH, or cathode currents (the total of plate, screen and grid currents) is as follows:

	6 meters	2 meters
CW	130 - 170 ma.	150 - 190 ma.
Phone	80 - 110 ma.	90 - 135 ma.

These readings are affected by line voltage variations, antenna characteristics, tube variations and circuit variations.

On Phone, one may talk as long as desired. On CW, send CW as long as desired but do not hold the key down for more than a couple of minutes. Remember that CW is a "part time" operation - the carrier is off a good part of the time. If tests require long key-down operation on CW, tune carefully.

ALTERNATE STEP 11:

Step 11 above is rather simple and is sufficient for most operations. However, as the user becomes more familiar with the transmitter, he may want to use a better method for arriving at the proper final grid current. The final will operate with more efficiency with this alternate method. It can be done as follows:

With the METER switch on ANT. and the DRIVE control at maximum (never allow the final grid to have more than 5 ma. for more than a few seconds), adjust the DRIVE control from the maximum point downwards. As the control is turned down, the meter reading will increase and then decrease. Turn the control up again (clockwise) --- just past the peak reading to where the meter reading starts to drop very slightly. This is the best operating point. The METER switch can then be thrown to GRID. The grid current reading is usually very close to 3 ma., but it may be as low as 2 ma. or as high as 3.5 ma. Note that this procedure is good for general use, on any Class C amplifier -- for phone or CW.

SPOT SWITCH: There is a switch on the MIC GAIN control. It is normally in the "ON" position. If the MIC GAIN control is turned counter-clockwise - past 0 - the switch will snap to the "OFF" position. In this position, the final amplifier and the driver are disabled, and the VFO, V1 and V2 are turned on by grounding the cathodes. This permits tuning in the signal on the receiver, without putting a signal on to the antenna. Either the receiver can be exactly tuned to a crystal frequency or, when a VFO is used, the VFO can be tuned in exactly to the same frequency as the station the receiver is tuned in on. As soon as the tuning is completed, turn the MIC GAIN back to the original setting.

RELAYS

Circuits for the changeover from receive to transmit can have practically infinite variations. Some of the switching that may have to be done, depending on the equipment combination, is as follows:

Disable the receiver.

Transfer the antenna from the receiver to the transmitter.

Short out or otherwise protect the receiver (or converter) input from damage from energy produced by the transmitter. Open contacts on an ordinary relay or switch are no protection.

Key the transmitter.

Key the VFO.

The least expensive system is to use manually operated switches for all changes. However, after a short time, the operating clumsiness of this will become obvious. The best system is to use a relay especially made for this purpose. An arrangement will be described in detail for mixed phone and CW operation. It uses the Dow-Key DK60-G2C Relay with double pole double throw auxiliary contacts and a 12 volt DC coil. The initial cost may seem high, but there is no equivalent unit on the market that will do the job. The use of this relay makes for extremely convenient operating conditions.

CONNECTING THE DOW-KEY RELAY (See Figs. 2 to 6)

A. Find a convenient place to mount the relay with two screws. DO NOT mount it directly on to the coax connector on the transmitter or on other equipment because the SO-239 coaxial connector is not made to carry any more load than a plug and flexible cable.

B. Obtain an octal male plug such as an Amphenol 86CP8 with a 3-12 or 3-24 cap.

C. Connect the relay coil to octal pins 6 and 7 with a good grade of flexible wire. Lamp cord is good. Cover the relay coil terminals with electrical tape.

D. Connect the auxiliary contacts of the relay as described below to provide receiver muting. See Fig. 2. The pin numbers refereed to below are on the octal plug. Note that a ground wire MUST be connected from chassis to chassis as mentioned in step #1 of Installation on Page 3. DO NOT use an AC/DC receiver.

D1. Connect the center terminal of one set of SPDT contacts to pin 1 of the octal plug.

D2. Disconnect the lead that connects the speaker to the grounded audio terminal on the receiver.

D3. Connect the terminal of the normally closed contact to the terminal of the speaker that was just disconnected.

D4. Do not disturb the other side of the speaker that is connected to the hot audio output terminal on the receiver.

D5. Connect a resistor across the output audio terminals of the receiver. If the speaker impedance is 3.2 or 4 ohms, use a 10 ohm, one watt resistor. If it is a high impedance speaker (4,000 ohms is typical), use a 10,000 ohm, one watt resistor.

D6. Connect the key terminal of the VFO (if one is used) to pin 2 of the octal plug.

E. Connect the center terminal of the other set of the SPDT auxiliary contacts to pin 8 of the octal plug. Connect the normally open contact to the hot terminal of the telegraph key. Do not connect anything to the third auxiliary contact. Connect the ground side of the telegraph key to pin 1 of the octal plug. Note that it is necessary to have a key with a shorting lever on it, or it will be necessary to add a switch across the key. If only phone operation is planned, omit the key and connect the normally open contact directly to pin 1 of the octal plug.

F. Insert the octal plug into the socket at the rear of the transmitter.

G. Connect the transmitter to the relay with a short piece of coaxial cable of the same type used in the lead-in from the antenna. Use a PL-259 plug on each end of the cable. A filter or antenna tuner can be connected between the transmitter and the relay, if desired.

H. Connect the relay to the receiver or converter using the same type of cable. Use a PL-259 plug on the relay end and a connector that will mate with the other unit at the other end.

I. Connect the antenna to the relay with another PL-259 plug. If a bridge is used, connect the Standing Wave Ratio Bridge between the relay and the antenna.

When the relay is connected in this way, the changeover from receive to transmit is completed by operating the push-to-talk button on the microphone, or an optional extra switch across pins 1 and 7 can be used. If the transmission is to be on CW, the shorting lever on the key must be open. It must be closed for phone operation.

Note that there is no mention of breaking a B+ or cathode line or other disabling of the receiver or converter. There is no benefit to be derived from this kind of switching. There is a definite advantage in having this circuit operating. With the receiver in full operation, except for the broken speaker line and the very high loss between the antenna and the converter or receiver input which the relay provides, the receiver can be used to check the signal from the transmitter. If the headphones are plugged into the receiver, it is possible to monitor the transmitter for distortion, drift, frequency modulation, hum, etc.

ALIGNMENT

The TX-62 has a number of broadband circuits to eliminate the need for several panel adjustments usually found on this type of equipment. An additional advantage of the broadband circuits is the reduction of spurious outputs. This is because there are two tuned circuits used where there is usually only one, giving better attenuation of the unwanted harmonics in the multiplier stages.

These circuits are not likely to require any adjustment UNLESS THEY HAVE BEEN TAMPERED WITH.

The normal alignment gives satisfactory drive to the final over the whole 2 meter band and from 50 to 52 Mc. on the 6 meter band. There are two reasons for tuning for 2 instead of 4 Mc. on 6 meters. First, there is very little activity above 52 Mc., even in good band openings. Second, it permits slightly better attenuation of spurious signals. MARS and CAP frequencies outside both bands are covered.

Alignment should be done at the factory.

Alignment instructions are available, on request (send self-addressed stamped envelope) for those who have both the test equipment and experience in aligning broad-band amplifiers.

SERVICE DATA

No matter how well equipment is designed and manufactured, defects are bound to occur. The purpose of this section is to correct these defects as easily as possible. In case of any difficulty, the first step is to deter-

mine definitely that a defective condition exists. If the transmitter or the equipment connected to it is not operated correctly, certain indications of trouble might be presented when there is actually nothing wrong. The operator must be thoroughly familiar with the operating procedures, before attempting to shoot trouble.

After a positive determination is made that the transmitter has a fault, the first step is to localize the fault. Once the trouble is narrowed down to a single tube or circuit, the faulty part is quite simple to identify.

With the Trouble Shooting Data Chart, Voltage and Resistance Data (Tables), localizing trouble becomes relatively simple.

TROUBLE SHOOTING DATA

DO NOT DISTURB ALIGNMENT ADJUSTMENTS

SYMPTOMS AND POSSIBLE CAUSES:

1. Transmitter will not operate when AC power is applied. Pilot light will not light.
   a. Defective 5 amp. fuse.
   b. Poor contact at AC outlet.
   c. Defective POWER switch.
   d. Open high voltage rectifier diodes, D2, D3.
   e. Open 20 ohm wire wound resistor, R43.

2. Fuse blows.
   a. Wrong size fuse. Use 5 amp. 3AG fuse.
   b. Short in high voltage circuits:
      Rectifier diode or diodes D2, D3.
      Filter capacitors C48, C49.
      Bypass capacitors or coupling capacitors C27, C28, C29.
      Wiring shorts.
   c. Power transformer shorted or burned.
   d. Shorted tube: 7984, 7868.

3. No final cathode current reading on meter.
   a. Key not connected or not operated.
   b. Meter open
   c. Meter switch not making contact. See that it can move freely to all 3 positions without being stopped by the panel. If it doesn't move freely, loosen mounting screws and reset the switch.
   d. No high voltage. See 1d, 1e.
   e. Defective tube 7984.
   f. Open RF choke L12.
   g. Jumper on octal socket, J3, cut.
   h. R39 open.
   i. No plug in J3.

4. No final grid current reading on meter.
   a. 1d, 1e, 3a, 3b, 3c, 3e, 3g.
   b. Defective crystal, no crystal plugged in.
   c. VFO turned off or defective.
   d. VFO-CRYSTAL switch in the wrong position.
   e. Any defective part or tube in the V1, V2, V3, V4 circuits. Check voltages.

5. Insufficient or drooping grid current reading on the meter.
   a. Defective crystal or VFO with insufficient output.
   b. Weak tube V1, V2 or V3.
   c. Alignment poor or tampered with.
   d. Drive control too high for the particular combination of crystal or VFO and the tubes V1 or V2.

6. Final PLATE and LOAD tuning unsatisfactory.
   a. Antenna has a high standing wave ratio (SWR). Check it with an SWR bridge.
   b. Antenna disconnected.
   c. Antenna relay not working or not connected properly.
   d. Wrong filter connected in the antenna line for the band in use.

7. No ANT reading on meter. Other readings normal, signals getting out O.K.
   a. 3c.
   b. Defective part: D1, R20, C32.
   c. Wiring short or break.

8. No change in METER readings when switching from CW to PHONE.
   a. Defective V6, R34, D5, S4.

9. No modulation.
   a. 8a.
   b. Defective microphone or microphone cable.
   c. Incorrectly wired microphone plug.
   d. Wiring or part defect in V5-V6 circuits.

10. Hum in modulation.
    a. Unshielded or incorrectly connected microphone cable.
    b. Defective C49.
    c. V5 defective.

11. Distortion, squeal or overmodulation.
    a. Defective V5.
    b. 10a, 9b, 9c.
    c. Receiver not properly muted during transmission.
    d. Defective C36, C40.
    e. Antenna disconnected or defective. Relay not making contact.

12. Smoke.
    a. Turn off power, turn transmitter over quickly and try to locate the source of the smoke. Use a strong light if possible. This is the easiest trouble to find. Replace the damaged part. Locate the cause and correct it. The burned part is seldom the faulty one. Use the resistance chart to help locate the trouble.

13. DO NOT disturb any alignment adjustments when shooting trouble unless absolutely necessary. Unnecessary tuning is one of the best ways to make more trouble.

NOTES FOR THE VOLTAGE AND RESISTANCE TABLE: The measurements are made with a vacuum tube volt meter (VTVM) with 11 megohms of input resistance on DC volts. The AC line voltage should be 117 volts at 60 cycles. The readings are typical, average and subject to variations from differences in line voltage, tubes, test frequency, alignment and antenna or dummy load. All measurements are made from the point indicated to the transmitter chassis or ground.

OHMMETER POLARITY: Diodes are used in the solid state power supply, as well as in the modulator and final stages. These diodes cause some of the ohmmeter readings to be different when the ohmmeter polarity is reversed. Therefore, if the ohmmeter reading is somewhat different (possibly lower) from the value given in the chart, change the polarity of the ohmmeter leads. If there is no trouble at this point, the reading should be the same as that given in the chart.

The controls are set as follows:
POWER to ON
VFO-CRYSTAL to CRYSTAL
MIC GAIN at zero
PLATE and LOAD are tuned normally
CW-PHONE, BAND and METER switches are set as needed in testing.

* Indicates that the measurement is made with a 470K 1/2 watt resistor in series with the VTVM probe tip and the point listed.

@ Indicates that the reading can vary considerably.

See paragraph on Ohmmeter Polarity.

The filament voltages are as follows:

V1, V2, V3 and V6	Pin 4 - 6.4 volts AC
V4	Pin 12 - 13.5 volts AC.
V5	Pin 9 - 6.4 volts AC.

WARRANTY POLICY

The Ameco Equipment Corp. warrants its equipment, when properly registered, against defects in workmanship, materials and construction under normal use and service for a period of ninety days from the date of original purchase. Under this warranty, our obligation is limited to repairing or replacing any defective parts. This warranty does not apply to any equipment which has been tampered with in any way, or which has been misused or damaged by accident or negligence.

This warranty is valid only when the enclosed card is properly filled in and returned within ten days from purchase date. The Ameco Equipment Corp. reserves the right to discontinue or change, at any time, specifications, design or prices without notice and without incurring obligations. Do not send equipment to the factory without first securing authorization to do so. This warranty does not include transportation costs to and from the factory.

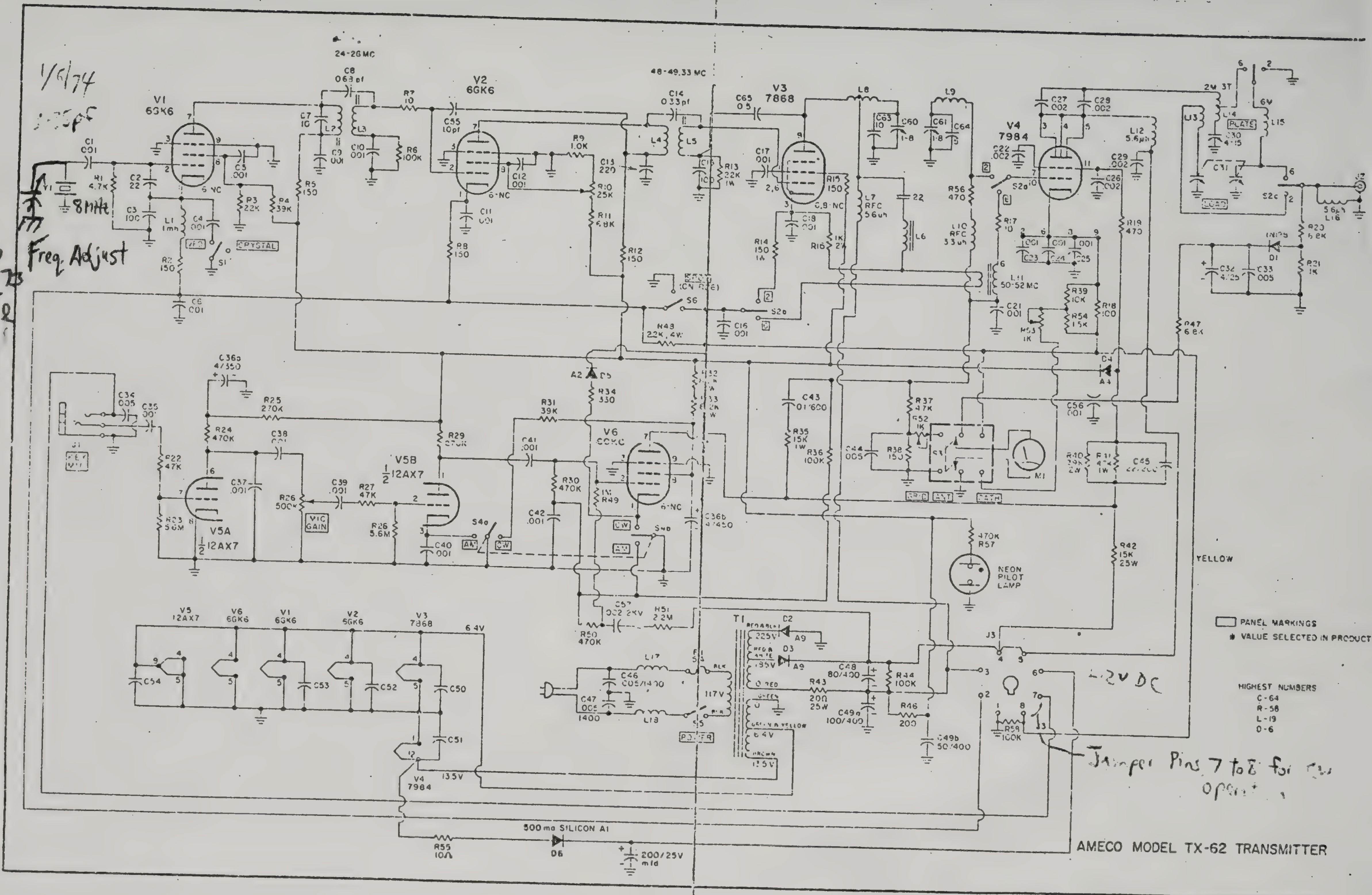
AMECO EQUIPMENT CORP.
178 Herricks Road
Mineola, L.I., New York 11501

VOLTAGE RESISTANCE CHART OF TX-62

Voltages are given in volts; Resistance values are in ohms. K indicates X 1,000; M indicates X 1,000,000.
V = Voltage. R = Resistance. See Notes on Page 6

			6 METERS				2 METERS			
			CW #		PHONE #		CW #		PHONE #	
Tube	Pin No.	V or R	Key Down	Key Up	Key Down	Key Up	Key Down	Key Up	Key Down	Key Up
V1	1	V*	2.5	24	2.5	70	2.5	24	2.5	70
		R #	200	100K	200	100K	200	100K	200	100K
	2	V*	-4	0	-4	0	-4.4	0	-4.4	0
		R	4.7K	4.7K	4.7K	4.7K	4.7K	4.7K	4.7K	4.7K
	7	V	285	340	295	355	260	330	280	350
		R	33K	33K	72K	72K	33K	33K	72K	72K
	8	V	80	112	83	120	75	115	78	120
		R	20K	20K	20K	20K	20K	20K	20K	20K
V2	1	V	@2.5	24	@2.5	70	@2.2	24	@2.2	70
		R #	150	100K	150	100K	150	100K	150	100K
	2	V*	@-80	0	@-80	0	@-80	0	@-80	0
		R	100K	100K	100K	100K	100K	100K	100K	100K
	7	V	285	340	295	355	265	340	280	355
		R	33K	33K	72K	72K	33K	33K	72K	72K
	8	V	10 to 250, depending on setting of drive control - -					- - - -	- - - - - -	- - - -
		R	1K to 26K, depending on setting of drive control - -					- - - -	- - - - - -	- - - -
V3	3	V	36	24	37	70	12	24	12	70
		R #	1K	100K	1K	100K	150	100K	150	100K
	2, 6	V	0	0	0	0	72	0	46	0
		R	22K	22K	22K	22K	22K	22K	22K	22K
	1, 7	V	290	330	300	350	260	330	275	350
		R	33K	33K	72K	72K	33K	33K	72K	72K
	9	V	295	340	305	355	280	340	290	355
		R	33K	33K	72K	72K	33K	33K	72K	72K
V4	2, 6, 8, 9	V	17	24	10	70	20	24	12	70
		R #	100	100K	100	100K	100	100K	100	100K
	10	V	12	0	12	0	12	0	12	0
		R	4.8K	4.8K	4.8K	4.8K	5.3K	5.3K	5.3K	5.3K
	7, 11	V	200	23	125	355	210	21	115	355
		R #	130K	130K	130K	130K	130K	130K	130K	130K
	3, 4, 5	V	520	590	540	620	500	600	530	630
		R	130K	130K	170K	170K	130K	130K	170K	170K
V5a	6	V	77	85	75	82	70	80	70	77
		R	800K	800K	800K	800K	800K	800K	800K	800K
	7	V	-0.8	-0.8	-0.8	-0.8	-0.8	-0.8	-0.8	-0.8
		R	5.6M	5.6M	5.6M	5.6M	5.6M	5.6M	5.6M	5.6M
	8	V	0	0	0	0	0	0	0	0
		R	0	0	0	0	0	0	0	0
V5b	1	V	270	310	100	105	255	310	97	110
		R	350K	350K	350K	350K	350K	350K	350K	350K
	2	V	0	0	-0.8	-0.8	0	0	-0.8	-0.8
		R	5.6M	5.6M	5.6M	5.6M	5.6M	5.6M	5.6M	5.6M
	3	V	7	7	0	0	7	7	0	0
		R	∞	∞	0	0	∞	∞	0	0
V6	1	V	0	0	9	70	0	0	9	70
		R #	0	0	@	100K	0	0	@	100K
	2	V	0	0	0	0	0	0	0	0
		R	570K	570K	470K	470K	570K	570K	470K	470K
	7	V	400	23	180	520	390	21	180	510
		R	130K	130K	180K	180K	130K	130K	180K	180K
	8	V	205	120	260	350	190	125	240	355
		R	30K	30K	90K	90K	30K	30K	90K	90K
Octal Socket On Rear	3	V	295	340	305	355	280	340	290	355
		R	33K	33K	72K	72K	33K	33K	72K	72K
	4, 5	V	520	590	540	620	500	600	530	630
		R	130K	130K	170K	170K	130K	130K	170K	170K
	2, 8	V	0	24	0	70	0	24	0	70
		R	0	100K	0	100K	0	100K	0	100K
	6	V	10	19	10	19	10	19	10	19
		R	@#	@#	@#	@#	@#	@#	@#	@#

Extra copy of schematic



1/6/74

1.35pF

8MHz

Freq. Adjust

VCXO June 73 QST Lints & Kicks p. 48

12V DC

Jumper Pins 7 to 8 for [illegible] operation

AMECO MODEL TX-62 TRANSMITTER

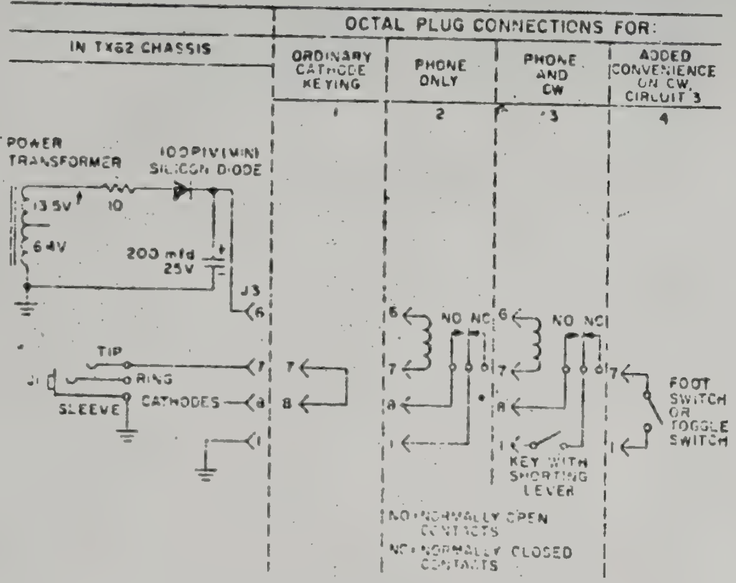

IN TX62 CHASSIS
OCTAL PLUG CONNECTIONS FOR:
ORDINARY CATHODE KEYING
PHONE ONLY
PHONE AND CW
ADDED CONVENIENCE ON CW, CIRCUIT 3
1
2
3
4
POWER TRANSFORMER
100PIV(MINI) SILICON DIODE
135V
10
64V
200 mfd 25V
J3
TIP
RING
J1
SLEEVE
CATHODES
NO NC
FOOT SWITCH OR TOGGLE SWITCH
KEY WITH SHORTING LEVER
NO: NORMALLY OPEN CONTACTS
NC: NORMALLY CLOSED CONTACTS

Fig. 2. RELAY AND KEY CONNECTIONS TO TRANSMITTER

See "RELAYS" on Page 4 of instructions.

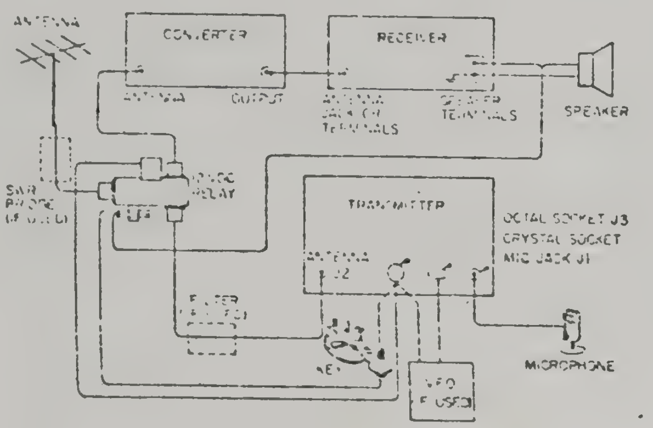


Fig. 3. CONNECTIONS FOR PHONE AND CW OPERATION

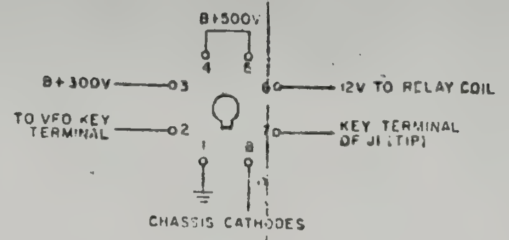


Fig. 4. OCTAL SOCKET

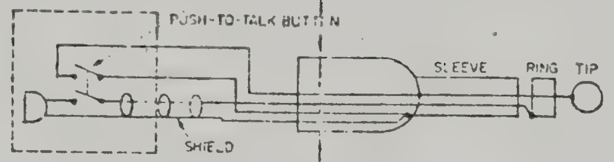


Fig. 5. MICROPHONE AND PLUG

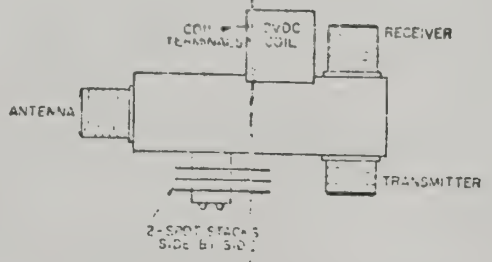


Fig. 6. DOW-KEY DK60-G2C RELAY

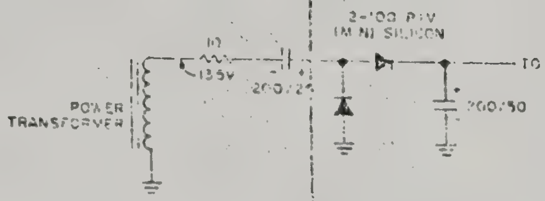


Fig. 7. POWER SUPPLY FOR 117V AC DOW-KEY OR 28V DC RELAYS.
If this circuit is put in the TX-62, DO NOT DISTURB the blue discs on the terminal strip. They are the meter calibrating adjustments. Note also, that the second capacitor is 50 volts.

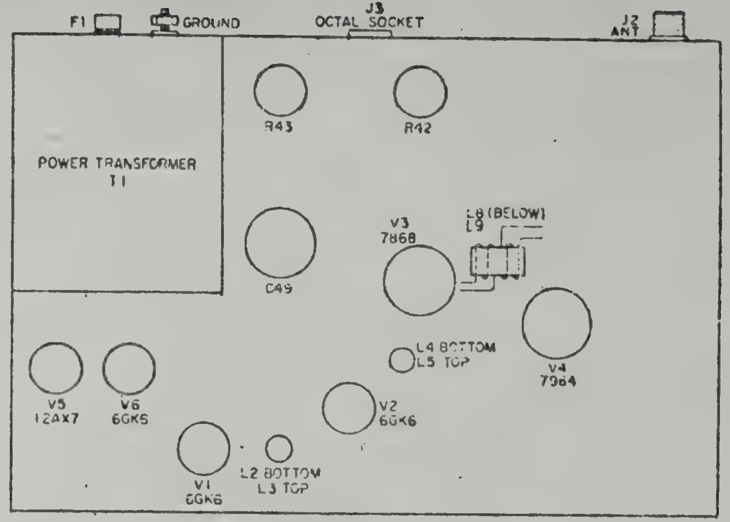


Fig. 8. TOP VIEW OF CHASSIS

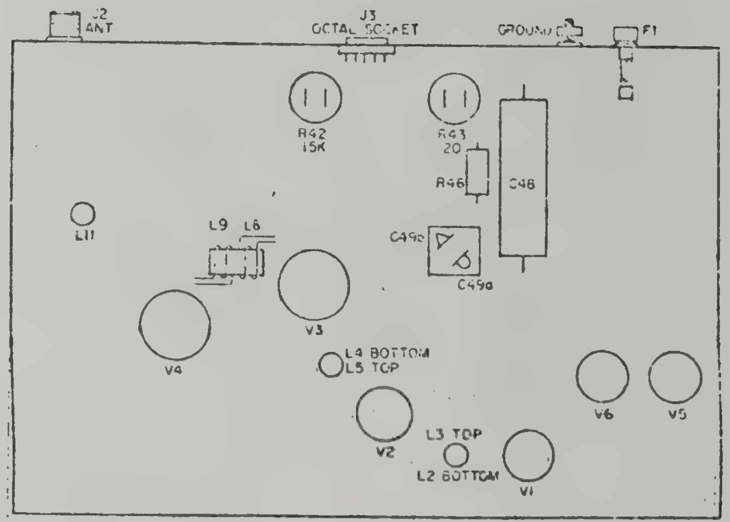


Fig. 9. BOTTOM VIEW OF CHASSIS

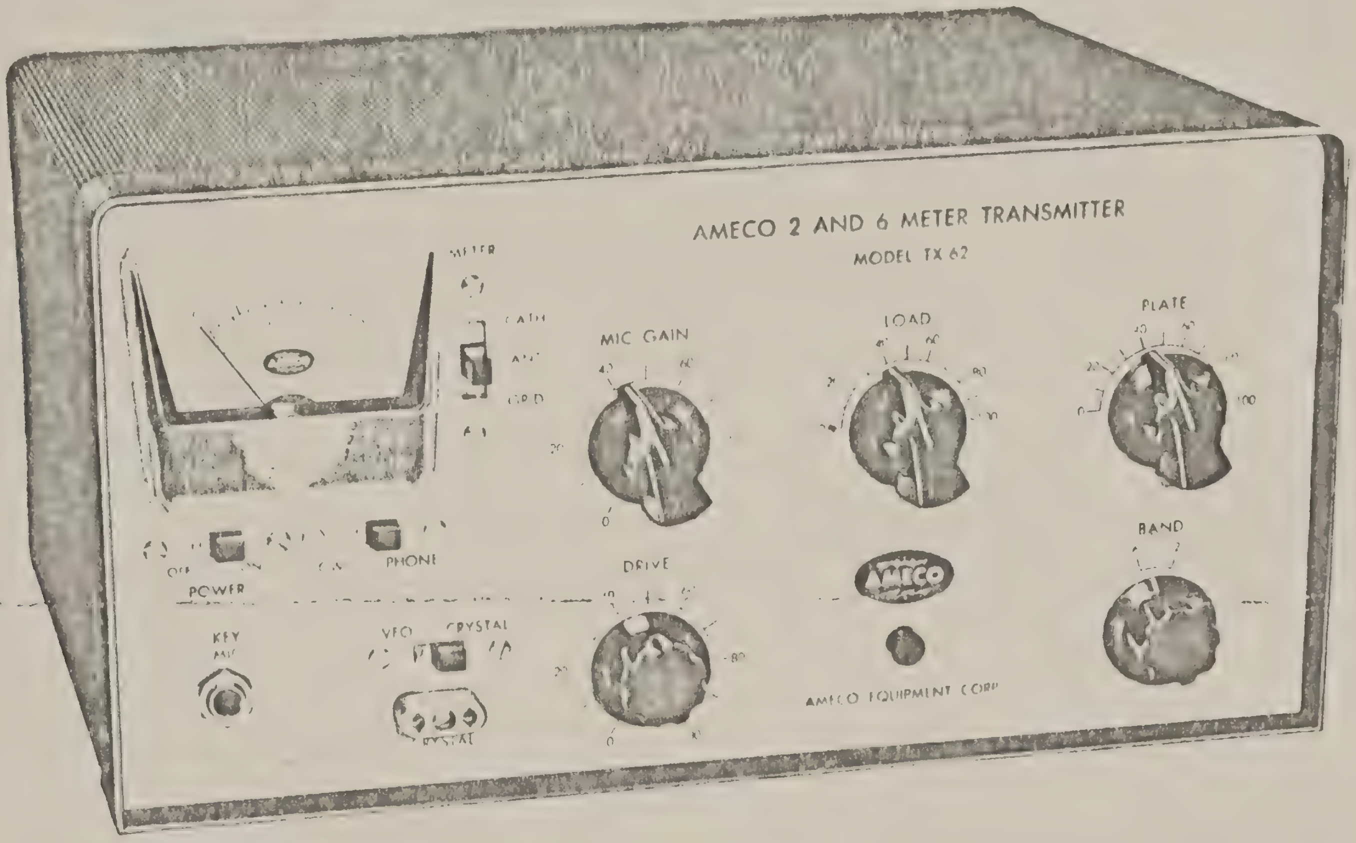
OPERATING INSTRUCTIONS FOR AMECO TRANSMITTER, MODEL TX-62

IT IS IMPORTANT THAT THIS ENTIRE MANUAL BE READ CAREFULLY BEFORE THE TRANSMITTER IS PLUGGED INTO AN OUTLET AND BEFORE ANY OPERATING IS DONE WITH THE TRANSMITTER.

SAFETY NOTICE

Voltages of over 600 volts DC are present in the TX-62 when the unit is in operation. THESE VOLTAGES CAN BE DANGEROUS. Occasionally a few tests may have to be made inside the set with the high voltage on. NOTE that this voltage is present, whether the key is up or down. Observe all safety precautions. When it is necessary to make measurements with the power on, use only one hand. Keep the other hand in your pocket. Do not lean on the table or touch any other object.

DO NOT ATTEMPT TO MAKE ANY REPAIRS OR CHANGE TUBES WITH THE POWER ON. Disconnect the plug from the AC line before doing any work inside the transmitter.



GENERAL INFORMATION

The Ameco Model TX-62 Transmitter is a compact, convenient, easy-to-operate transmitter for the 6 and 2 meter bands. The TX-62 has 75 watts input on CW and 75 watts peak input on phone. It has a built-in AC power supply and modulator. All exciter circuits are broadbanded. Only the final plate and loading capacitors have to be tuned. A potentiometer-type drive control is used to set the drive level to the final grid. The final is operated straight through on both bands.

The TX-62 uses the low distortion Ameco DUO-GRID modulation. It is NOT controlled carrier or clamp tube modulation, but a far superior system with quality that cannot be distinguished from push-pull plate modulation, even with an oscilloscope. The percentage of modulation is controlled by an audio gain control on the front panel.

SPECIFICATIONS

FREQUENCY COVERAGE: 50-52 Mc. and 144-148 Mc.

POWER INPUT TO FINAL: CW - 75 watts,
Phone - 75 watts peak

TUBES AND FUNCTIONS: 6GK6 crystal controlled oscillator and tripler, 6GK6 doubler, 7868 driver, 7984 final, 12AX7 audio voltage amplifier and 6GK6 modulator. The modulator is used as a clamp tube on CW.

FREQUENCY CONTROL: Crystal controlled, using inexpensive 8 Mc. crystals or an external VFO can be used.

METER reads final cathode current, final grid current and RF output.

CONTROLS: POWER switch; PHONE-CW switch; METER selector switch; VFO-CRYSTAL switch; MIC GAIN control and spot switch; DRIVE control; BAND switch; Final PLATE tuning; LOAD.
The jack for the microphone or key and the crystal socket are on the front panel. Additional connections can be made to an octal socket on the rear of the chassis for key, relay, etc.

SIZE: 11-1/2 x 9-1/2 x 6 inches. WEIGHT: 18-1/2 lbs.

POWER: AC-117 volts, 60 cycles, 220 watts maximum. For 12 volts DC operation, a Heath MP-10 Power Supply

can be used.

ANTENNA: The TX-62 is designed to be used with 50 or 72 ohm coaxial line fed antennas. For balanced lines of 200, 300, 450 or 600 ohms, either a balun made from coaxial cable or an antenna tuner can be used. These will provide the conversion from balanced to coaxial line. See the ARRL Handbooks for details. Baluns are described in the section on Antennas (1964 page 385) and dimensions are in a table in the section on VHF Antennas (1964 page 456). An Antenna Tuner is described in the section on VHF Transmitters (1964 page 452). This data is in all the Handbooks from 1957 on.

The antenna jack is an SO-239 (83-1R) connector which requires a PL-259 (83-1SP) plug on the antenna cable.

For best results, a beam antenna should be used. The more elements the beam has, the better, especially on 2 meters. The "halo", the "big wheel", the "whip" and other non-directional types can be used for net, local contacts and mobile operation.

CRYSTALS: The crystals used are the popular 8 Mc. series -- in FT-243 holders. The frequency of the crystal is multiplied by six to get the transmitting frequency on 6 meters. It is multiplied by 18 to get the transmitting frequency on 2 meters. In other words, 8.3333 Mc. to 8.6667 Mc. crystals are to be used for 6 meters and 8.0000 Mc. to 8.2222 Mc. crystals are to be used for 2 meters. Because phone operation on 6 meters is above 50.10000 Mc., only the crystals above 8.350 Mc. can be used for 6 meter phone operation. If operation in the 145 Mc. to 147 Mc. band is desired, the crystal frequency must be between 8.0555 Mc. and 8.1666 Mc.

VFO: The output of the external VFO must be plugged into the crystal socket and the crystal-VFO switch is then thrown to the VFO position. The ground contact on the VFO-crystal socket is the one next to the MIC jack. The operation of the transmitter is the same for VFO or crystal.

The VFO must be capable of delivering between 7 and 14 volts at 8 Mc. to 8.66 Mc. However, the VFO frequency is not limited to 8 Mc. to 8.66 Mc. Equally satisfactory is a VFO that delivers 2.5 to 5 volts at 12.0 Mc. to 13 Mc., or 1.0 to 2.0 volts at 24 Mc. to 26 Mc. The 24 Mc. to 26 Mc. VFO is the best one to use. The AMECO VFO-621 operates in this range.

MICROPHONE: Any high impedance microphone (crystal, ceramic or dynamic) can be used. The microphone is connected to the transmitter by a three-contact 1/4" diameter phone plug. Switchcraft phone plugs, Models 60, 90, 260, 269, 290 or 297 can be used. Some of these models are shielded and some are not. Shielded types are best, but no difficulty has been noted with the plastic shell plugs.

The tip of the plug is the key line, the ring is the hot side of the microphone and the sleeve is the ground. The microphone cable is attached to the plug in the following manner (See Figure 2): Connect the cable shield from the microphone cable to the sleeve of the plug. Connect the hot microphone lead of the cable to the ring of the plug. Connect the lead coming from the push-to-talk button to the tip of the plug.

No provision is made for the use of a carbon microphone.

KEY: Any key can be used for CW; --- straight, side swiper, bug or electronic.

CIRCUIT DESCRIPTION

The TX-62 uses a 6GK6 pentode tube as a crystal oscillator. It uses standard, inexpensive, 8 to 9 Mc. fundamental type crystals. By throwing a switch on the panel from crystal to VFO, the variable frequency oscillator can be connected to the crystal socket instead of the crystal. When this is done, the 6GK6 oscillator works as an amplifier or frequency multiplier.

The plate of the oscillator is connected to a dual tuned RF transformer (L2 and L3). This feeds the resultant 24 Mc. to 26 Mc. signal to the second 6GK6 tube. This second tube operates as a frequency doubler. Its plate is connected to a dual tuned RF transformer (L4 and L5) which feeds the 48 Mc. to 52 Mc. signal to the third tube, a 7868 pentode. On 2 meters, the 7868 tube is used as a tripler to produce the 144 Mc. to 148 Mc. signal for the final grid, through the broadband transformer, L8 and L9. On 6 meters, the 7868 works straight through, driving the final grid through L6, the 6 meter plate coil which is connected to the link on L11, the final grid coil. The combination of L6 and L11 forms a broadband transformer covering the 6 meter band. No front panel adjustments are used in any of the circuits described above. The circuits are broadbanded and do not have to be tuned.

The final amplifier is a 7984 tube. This is a new type, developed for use in the commercial mobile service for frequencies up to 175 Mc. The plate circuit is a pi-net on 6 meters. It is a series tuned, link coupled arrangement on 2 meters. Separate sections of the same variable capacitor are used for loading on the two bands. One capacitor is used to tune the plate on both bands. To simplify tuning, the meter is connected to a diode RF detector at the bandswitch. It is always better to tune a transmitter for RF output rather than for a plate current dip. They rarely coincide. After tuning, the plate current can always be checked.

The modulator, to the careless eye, appears to be either clamp tube or controlled carrier. It is neither. The TX-62 modulator does not sound like either type. It is clean to listen to, clean to look at on an oscilloscope and gets through when the going is rough. The first tube, a 12AX7, is used as a two-stage voltage amplifier. The second tube, a 6GK6, is the modulator. It is connected to the 7984 final screen as a Heising modulator. A proportion of the audio signal is also fed into the control grid of the 7984. With screen modulation alone, distortion increases sharply above approximately 65% modulation. When the grid is also modulated, as in the Ameco system, this distortion is reduced to a very low value permitting clean, 100% modulation with a very simple circuit. When the transmitter is operated on CW the modulator tube is reconnected as a clamp tube to protect the final in case of loss of excitation. On phone, the reduced screen voltage provides some protection for the final.

INSTALLATION

READ THIS ENTIRE SECTION OVER CAREFULLY BEFORE DOING ANYTHING. THEN START WITH STEP ONE.

DO NOT PLUG THE TRANSMITTER INTO THE AC LINE OUTLET UNTIL THE INSTRUCTIONS BELOW TELL YOU TO DO SO.

1. Connect the wire from the ground terminal at the rear of the chassis to a good ground such as a cold water pipe. All other equipment such as the receiver, converters, power supplies, VFO, etc. should have good connections made to this same ground. Use a #14 or heavier wire. Do not depend on coaxial cable to provide a common ground. The RF bypass capacitors from the AC line to the chassis can give an unpleasant shock if the above grounding instructions are not followed. This is true for all makes of equipment. Do NOT use an AC/DC receiver in this setup.

2. Connect the antenna to the changeover relay or switch.

3. Connect the Standing Wave Bridge, if one is available. Instructions for this come with the Standing Wave Bridge.

4. Hook up the Low Pass Filter, if you are operating on 6 meters. A Drake TV-1000LP is recommended for this use. If you switch to 2 meters, remove the low pass filter from this circuit. The Gavin BP-144 filter is sometimes useful on 2 meters.

5. Connect the receive side of the relay to the converter or receiver.

6. Connect the transmit side of the relay to the coaxial jack on the back of the transmitter.

7. Connect the relay coil (See section on Connecting the Dow-Key Relay).

8. Plug in the microphone.

9. Plug in the crystal. If a VFO is to be used, use a crystal for at least the first tests.

OPERATION FOR PHONE AND CW

1. Preset the TX-62 controls as follows:
POWER switch to OFF, CW-PHONE switch to CW, VFO - CRYSTAL switch to CRYSTAL, METER switch to GRID, MIC GAIN at zero, DRIVE at 100, LOAD at zero, PLATE at about 50, BAND switch set on the band to be tuned up, Key or microphone switch should be open

2. Plug the line cord of the transmitter into the AC wall outlet.

3. Throw the power switch on. Wait for at least one full minute for the tubes to warm up.

4. Key the transmitter with the key or the button on the microphone momentarily and watch the meter. It should read between 2 and 9 ma.

5. If the meter reads above 5 ma., turn the drive control down to obtain a reading between 2 ma. and 5 ma.

6. Throw the meter switch to ANT.

7. Key the transmitter and tune the PLATE capacitor for maximum reading on the meter.

8. Key the transmitter and adjust the LOAD capacitor for maximum reading.

9. Repeat steps 7 and 8 several times until no further increase is obtained. Do NOT hold the key down for a long time. Hold it for just a few seconds at a time while each adjustment is made. During tuneup, it is very easy to overheat the final amplifier tube and shorten its life.

NOTE: Step 10 is for CW operation only. Steps 11 through 13 are for Phone Operation only.

10. (CW OPERATION ONLY) Throw the meter switch to GRID. Adjust the drive control for 3 ma. on the meter. Satisfactory results can be had with as little as 2 ma.

The transmitter is now tuned up for CW operation.

The following steps are for Phone operation only.

11. Throw the CW-PHONE switch to PHONE. Throw the METER switch to GRID. Adjust the DRIVE control for 3 ma. on the meter. Satisfactory results can be had with as little as 2 ma.

12. Throw the METER switch to ANT. This will permit observation of the RF output to the antenna, including the variations with modulation.

13. Adjust the MIC GAIN control until the meter swings up the scale on a few words -- on peaks -- about one-quarter way between the meter reading for CW and the meter reading for Phone when there is no modulation. If the meter does not swing at all, the modulation is too low. Either talk closer to the microphone or talk louder or turn the MIC GAIN control up higher. When the swing is excessive, the modulation is also excessive, causing distortion and often poor readability. In this case, turn the MIC GAIN control down.

The transmitter is now tuned for Phone operation.

Note that in the tuneup procedures above, the plate current is not mentioned. Accurate tuning cannot be had by tuning the TX-62 for plate current dip. A typical range of meter readings on CATH, or cathode currents (the total of plate, screen and grid currents) is as follows:

	6 meters	2 meters
CW	130 - 170 ma.	150 - 190 ma.
Phone	80 - 110 ma.	90 - 135 ma.

These readings are affected by line voltage variations, antenna characteristics, tube variations and circuit variations.

On Phone, one may talk as long as desired. On CW, send CW as long as desired but do not hold the key down for more than a couple of minutes. Remember that CW is a "part time" operation - the carrier is off a good part of the time. If tests require long key-down operation on CW, tune carefully.

ALTERNATE STEP 11:

Step 11 above is rather simple and is sufficient for most operations. However, as the user becomes more familiar with the transmitter, he may want to use a better method for arriving at the proper final grid current. The final will operate with more efficiency with this alternate method. It can be done as follows:

With the METER switch on ANT. and the DRIVE control at maximum (never allow the final grid to have more than 5 ma. for more than a few seconds), adjust the DRIVE control from the maximum point downwards. As the control is turned down, the meter reading will increase and then decrease. Turn the control up again (clockwise) --- just past the peak reading to where the meter reading starts to drop very slightly. This is the best operating point. The METER switch can then be thrown to GRID. The grid current reading is usually very close to 3 ma., but it may be as low as 2 ma. or as high as 3.5 ma. Note that this procedure is good for general use, on any Class C amplifier -- for phone or CW.

SPOT SWITCH: There is a switch on the MIC GAIN control. It is normally in the "ON" position. If the MIC GAIN control is turned counter-clockwise - past 0 - the switch will snap to the "OFF" position. In this position, the final amplifier and the driver are disabled, and the VFO, V1 and V2 are turned on by grounding the cathodes. This permits tuning in the signal on the receiver, without putting a signal on to the antenna. Either the receiver can be exactly tuned to a crystal frequency or, when a VFO is used, the VFO can be tuned in exactly to the same frequency as the station the receiver is tuned in on. As soon as the tuning is completed, turn the MIC GAIN back to the original setting.

RELAYS

Circuits for the changeover from receive to transmit can have practically infinite variations. Some of the switching that may have to be done, depending on the equipment combination, is as follows:

Disable the receiver.
Transfer the antenna from the receiver to the transmitter.
Short out or otherwise protect the receiver (or converter) input from damage from energy produced by the transmitter. Open contacts on an ordinary relay or switch are no protection.
Key the transmitter.
Key the VFO.

The least expensive system is to use manually operated switches for all changes. However, after a short time, the operating clumsiness of this will become obvious. The best system is to use a relay especially made for this purpose. An arrangement will be described in detail for mixed phone and CW operation. It uses the Dow-Key DK60-G2C Relay with double pole double throw auxiliary contacts and a 12 volt DC coil. The initial cost may seem high, but there is no equivalent unit on the market that will do the job. The use of this relay makes for extremely convenient operating conditions.

CONNECTING THE DOW-KEY RELAY (See Figs. 2 to 6)

A. Find a convenient place to mount the relay with two screws. DO NOT mount it directly on to the coax connector on the transmitter or on other equipment because the SO-239 coaxial connector is not made to carry any more load than a plug and flexible cable.

B. Obtain an octal male plug such as an Amphenol 86CP8 with a 3-12 or 3-24 cap.

C. Connect the relay coil to octal pins 6 and 7 with a good grade of flexible wire. Lamp cord is good. Cover the relay coil terminals with electrical tape.

D. Connect the auxiliary contacts of the relay as described below to provide receiver muting. See Fig. 2. The pin numbers refereed to below are on the octal plug. Note that a ground wire MUST be connected from chassis to chassis as mentioned in step #1 of Installation on Page 3. DO NOT use an AC/DC receiver.

D1. Connect the center terminal of one set of SPDT contacts to pin 1 of the octal plug.

D2. Disconnect the lead that connects the speaker to the grounded audio terminal on the receiver.

D3. Connect the terminal of the normally closed contact to the terminal of the speaker that was just disconnected.

D4. Do not disturb the other side of the speaker that is connected to the hot audio output terminal on the receiver.

D5. Connect a resistor across the output audio terminals of the receiver. If the speaker impedance is 3.2 or 4 ohms, use a 10 ohm, one watt resistor. If it is a high impedance speaker (4,000 ohms is typical), use a 10,000 ohm, one watt resistor.

D6. Connect the key terminal of the VFO (if one is used) to pin 2 of the octal plug.

E. Connect the center terminal of the other set of the SPDT auxiliary contacts to pin 8 of the octal plug. Connect the normally open contact to the hot terminal of the telegraph key. Do not connect anything to the third auxiliary contact. Connect the ground side of the telegraph key to pin 1 of the octal plug. Note that it is necessary to have a key with a shorting lever on it, or it will be necessary to add a switch across the key. If only phone operation is planned, omit the key and connect the normally open contact directly to pin 1 of the octal plug.

F. Insert the octal plug into the socket at the rear of the transmitter.

G. Connect the transmitter to the relay with a short piece of coaxial cable of the same type used in the lead-in from the antenna. Use a PL-259 plug on each end of the cable. A filter or antenna tuner can be connected between the transmitter and the relay, if desired.

H. Connect the relay to the receiver or converter using the same type of cable. Use a PL-259 plug on the relay end and a connector that will mate with the other unit at the other end.

I. Connect the antenna to the relay with another PL-259 plug. If a bridge is used, connect the Standing Wave Ratio Bridge between the relay and the antenna.

When the relay is connected in this way, the changeover from receive to transmit is completed by operating the push-to-talk button on the microphone, or an optional extra switch across pins 1 and 7 can be used. If the transmission is to be on CW, the shorting lever on the key must be open. It must be closed for phone operation.

Note that there is no mention of breaking a B+ or cathode line or other disabling of the receiver or converter. There is no benefit to be derived from this kind of switching. There is a definite advantage in having this circuit operating. With the receiver in full operation, except for the broken speaker line and the very high loss between the antenna and the converter or receiver input which the relay provides, the receiver can be used to check the signal from the transmitter. If the headphones are plugged into the receiver, it is possible to monitor the transmitter for distortion, drift, frequency modulation, hum, etc.

ALIGNMENT

The TX-62 has a number of broadband circuits to eliminate the need for several panel adjustments usually found on this type of equipment. An additional advantage of the broadband circuits is the reduction of spurious outputs. This is because there are two tuned circuits used where there is usually only one, giving better attenuation of the unwanted harmonics in the multiplier stages.

These circuits are not likely to require any adjustment UNLESS THEY HAVE BEEN TAMPERED WITH.

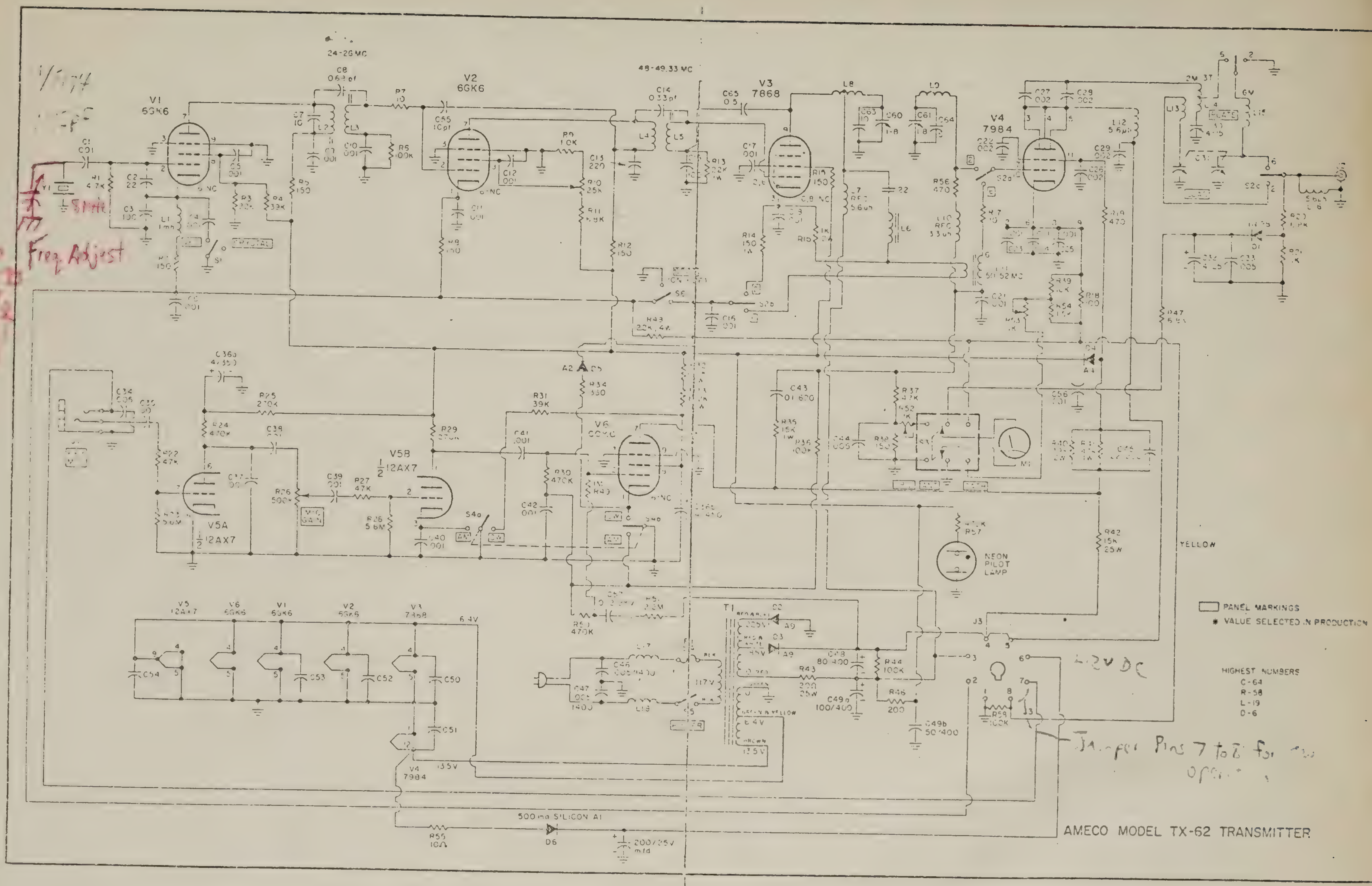
The normal alignment gives satisfactory drive to the final over the whole 2 meter band and from 50 to 52 Mc. on the 6 meter band. There are two reasons for tuning for 2 instead of 4 Mc. on 6 meters. First, there is very little activity above 52 Mc., even in good band openings. Second, it permits slightly better attenuation of spurious signals. MARS and CAP frequencies outside both bands are covered.

Alignment should be done at the factory.

Alignment instructions are available, on request (send self-addressed stamped envelope) for those who have both the test equipment and experience in aligning broad-band amplifiers.

SERVICE DATA

No matter how well equipment is designed and manufactured, defects are bound to occur. The purpose of this section is to correct these defects as easily as possible. In case of any difficulty, the first step is to deter-



AMECO MODEL TX-62 TRANSMITTER

Freq Adjust

12V DC

Jumper Pins 7 to 8 for [illegible] operation

NOTES FOR THE VOLTAGE AND RESISTANCE TABLE:

The measurements are made with a vacuum tube volt meter (VTVM) with 11 megohms of input resistance on DC volts. The AC line voltage should be 117 volts at 60 cycles. The readings are typical, average and subject to variations from differences in line voltage, tubes, test frequency, alignment and antenna or dummy load. All measurements are made from the point indicated to the transmitter chassis or ground.

OHMMETER POLARITY: Diodes are used in the solid state power supply, as well as in the modulator and final stages. These diodes cause some of the ohmmeter readings to be different when the ohmmeter polarity is reversed. Therefore, if the ohmmeter reading is somewhat different (possibly lower) from the value given in the chart, change the polarity of the ohmmeter leads. If there is no trouble at this point, the reading should be the same as that given in the chart.

The controls are set as follows:
POWER to ON
VFO-CRYSTAL to CRYSTAL
MIC GAIN at zero
PLATE and LOAD are tuned normally
CW-PHONE, BAND and METER switches are set as needed in testing.

* Indicates that the measurement is made with a 470K 1/2 watt resistor in series with the VTVM probe tip and the point listed.

@ Indicates that the reading can vary considerably.

# See paragraph on Ohmmeter Polarity.

The filament voltages are as follows:

V1, V2, V3 and V6	Pin 4 - 6.4 volts AC
V4	Pin 12 - 13.5 volts AC.
V5	Pin 9 - 6.4 volts AC.

WARRANTY POLICY

The Ameco Equipment Corp. warrants its equipment, when properly registered, against defects in workmanship, materials and construction under normal use and service for a period of ninety days from the date of original purchase. Under this warranty, our obligation is limited to repairing or replacing any defective parts. This warranty does not apply to any equipment which has been tampered with in any way, or which has been misused or damaged by accident or negligence.

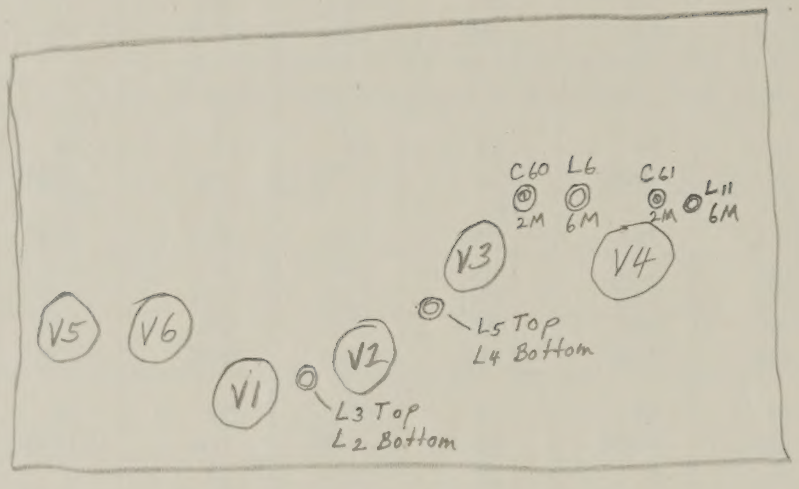
This warranty is valid only when the enclosed card is properly filled in and returned within ten days from purchase date. The Ameco Equipment Corp. reserves the right to discontinue or change, at any time, specifications, design or prices without notice and without incurring obligations. Do not send equipment to the factory without first securing authorization to do so. This warranty does not include transportation costs to and from the factory.

AMECO EQUIPMENT CORP.
178 Herricks Road
Mineola, L.I., New York 11501

VOLTAGE-RESISTANCE CHART OF TX-62

Voltages are given in volts; Resistance values are in ohms. K indicates X 1,000; M indicates X 1,000,000.
V = Voltage. R = Resistance. See Notes on Page 6

			6 METERS				2 METERS			
			C W #		PHONE #		C W #		PHONE #	
Tube	Pin No.	V or R	Key Down	Key Up	Key Down	Key Up	Key Down	Key Up	Key Down	Key Up
V1	1	V*	2.5	24	2.5	70	2.5	24	2.5	70
		R #	200	100K	200	100K	200	100K	200	100K
	2	V*	-4	0	-4	0	-4.4	0	-4.4	0
		R	4.7K	4.7K	4.7K	4.7K	4.7K	4.7K	4.7K	4.7K
	7	V	285	340	295	355	260	330	280	350
		R	33K	33K	72K	72K	33K	33K	72K	72K
	8	V	80	112	83	120	75	115	78	120
		R	20K	20K	20K	20K	20K	20K	20K	20K
V2	1	V	@2.5	24	@2.5	70	@2.2	24	@2.2	70
		R #	150	100K	150	100K	150	100K	150	100K
	2	V*	@-80	0	@-80	0	@-80	0	@-80	0
		R	100K	100K	100K	100K	100K	100K	100K	100K
	7	V	285	340	295	355	265	340	280	355
		R	33K	33K	72K	72K	33K	33K	72K	72K
	8	V	10 to 250, depending on setting of drive control - -					- - - - -	- - - - - -	- - - - -
		R	1K to 26K, depending on setting of drive control - -					- - - - -	- - - - - -	- - - - -
V3	3	V	36	24	37	70	12	24	12	70
		R #	1K	100K	1K	100K	150	100K	150	100K
	2, 6	V	0	0	0	0	72	0	46	0
		R	22K	22K	22K	22K	22K	22K	22K	22K
	1, 7	V	290	330	300	350	260	330	275	350
		R	33K	33K	72K	72K	33K	33K	72K	72K
	9	V	295	340	305	355	280	340	290	355
		R	33K	33K	72K	72K	33K	33K	72K	72K
V4	2, 6, 8, 9	V	17	24	10	70	20	24	12	70
		R #	100	100K	100	100K	100	100K	100	100K
	10	V	12	0	12	0	12	0	12	0
		R	4.8K	4.8K	4.8K	4.8K	5.3K	5.3K	5.3K	5.3K
	7, 11	V	200	23	125	355	210	21	115	355
		R #	130K	130K	130K	130K	130K	130K	130K	130K
	3, 4, 5	V	520	590	540	620	500	600	530	630
		R	130K	130K	170K	170K	130K	130K	170K	170K
V5a	6	V	77	85	75	82	70	80	70	77
		R	800K	800K	800K	800K	800K	800K	800K	800K
	7	V	-0.8	-0.8	-0.8	-0.8	-0.8	-0.8	-0.8	-0.8
		R	5.6M	5.6M	5.6M	5.6M	5.6M	5.6M	5.6M	5.6M
	8	V	0	0	0	0	0	0	0	0
		R	0	0	0	0	0	0	0	0
V5b	1	V	270	310	100	105	255	310	97	110
		R	350K	350K	350K	350K	350K	350K	350K	350K
	2	V	0	0	-0.8	-0.8	0	0	-0.8	-0.8
		R	5.6M	5.6M	5.6M	5.6M	5.6M	5.6M	5.6M	5.6M
	3	V	7	7	0	0	7	7	0	0
		R	∞	∞	0	0	∞	∞	0	0
V6	1	V	0	0	9	70	0	0	9	70
		R #	0	0	@	100K	0	0	@	100K
	2	V	0	0	0	0	0	0	0	0
		R	570K	570K	470K	470K	570K	570K	470K	470K
	7	V	400	23	180	520	390	21	180	510
		R	130K	130K	180K	180K	130K	130K	180K	180K
	8	V	205	120	260	350	190	125	240	355
		R	30K	30K	90K	90K	30K	30K	90K	90K
Octal Socket On Rear	3	V	295	340	305	355	280	340	290	355
		R	33K	33K	72K	72K	33K	33K	72K	72K
	4, 5	V	520	590	540	620	500	600	530	630
		R	130K	130K	170K	170K	130K	130K	170K	170K
	2, 8	V	0	24	0	70	0	24	0	70
		R	0	100K	0	100K	0	100K	0	100K
	6	V	10	19	10	19	10	19	10	19
		R	@#	@#	@#	@#	@#	@#	@#	@#


C60
L6
C61
2M
6M
2M
L11
6M
V3
V4
V5
V6
L5 Top
L4 Bottom
V2
V1
L3 Top
L2 Bottom

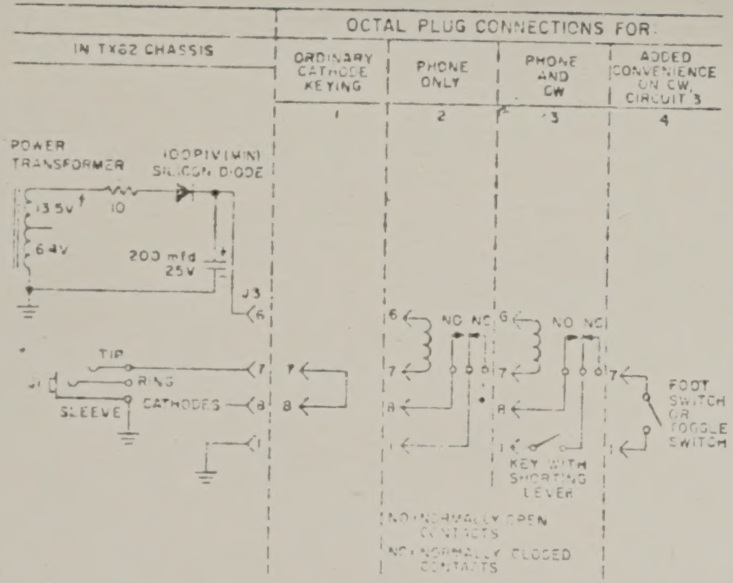

OCTAL PLUG CONNECTIONS FOR:
IN TX62 CHASSIS
ORDINARY CATHODE KEYING
PHONE ONLY
PHONE AND CW
ADDED CONVENIENCE ON CW, CIRCUIT 3
1
2
3
4
POWER TRANSFORMER
100PIV(MIN) SILICON DIODE
13.5V
10
6.4V
200 mfd 25V
J3
6
TIP
J1
RING
SLEEVE
CATHODES
7
8
1
NO
NC
KEY WITH SHORTING LEVER
FOOT SWITCH OR TOGGLE SWITCH
NO: NORMALLY OPEN CONTACTS
NC: NORMALLY CLOSED CONTACTS

Fig. 2. RELAY AND KEY CONNECTIONS TO TRANSMITTER

See "RELAYS" on Page 4 of instructions.

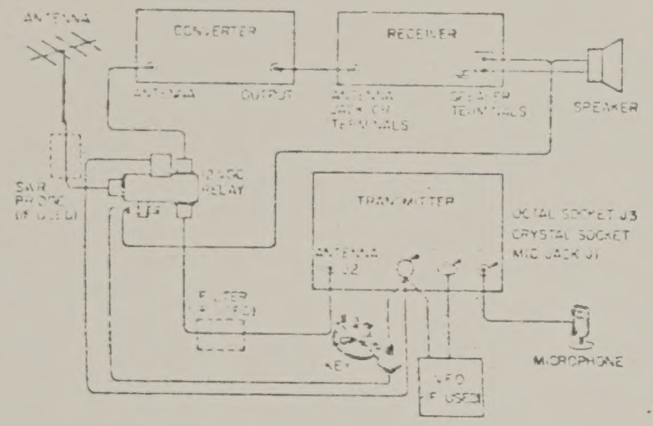


Fig. 3. CONNECTIONS FOR PHONE AND CW OPERATION

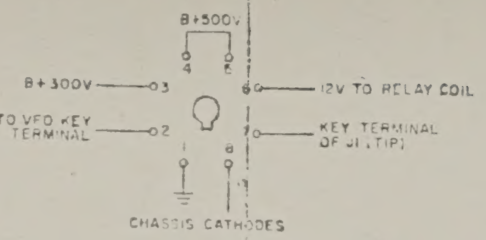


Fig. 4. OCTAL SOCKET

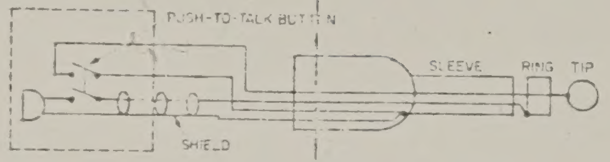


Fig. 5. MICROPHONE AND PLUG

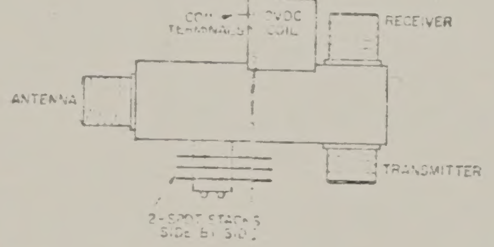


Fig. 6. DOW-KEY DK60-G2C RELAY

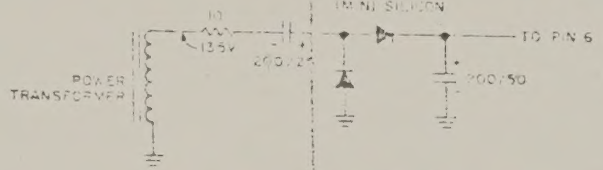


Fig. 7. POWER SUPPLY FOR 117V AC DOW-KEY OR 28V DC RELAYS.
If this circuit is put in the TX-62, DO NOT DISTURB the blue discs on the terminal strip. They are the meter calibrating adjustments. Note also, that the second capacitor is 50 volts.

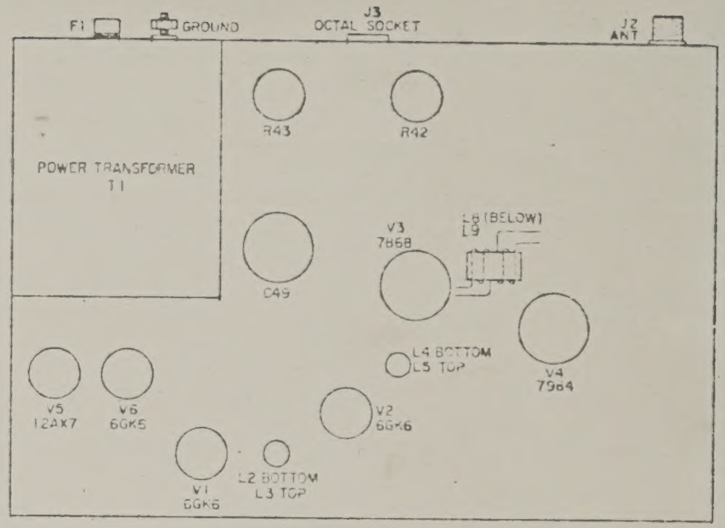


Fig. 8. TOP VIEW OF CHASSIS

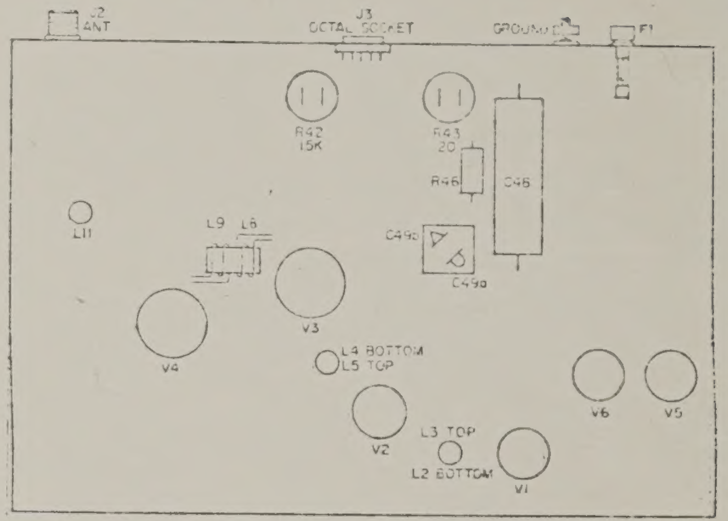


Fig. 9. BOTTOM VIEW OF CHASSIS